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Examining the Role and Benefits of DMT in Adults with Down syndrome: A Critical Review of the Literature

Melissa Briggs
Lesley University, mbriggs@lesley.edu

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Melissa Briggs

Dance/Movement Therapy

Dr. Rebecca Zarate

Abstract

This critical literature review investigates the use of dance/movement therapy (DMT) as a form of treatment for adults diagnosed with Down syndrome (DS). It examines how DMT can help adults with DS achieve higher functioning, enhanced well-being, and realize a greater sense of self-identity. The existing literature includes research studies, peer-reviewed articles, juried journals, theses, and dissertations which address how DMT has been used alone or in conjunction with other expressive therapies, to improve the overall quality of life in adults with DS. The material reviewed is organized according to the outcomes and benefits conferred upon adults with DS who have engaged in DMT as a form of treatment. The discussion addresses the strengths and weaknesses of the literature reviewed, to suggest the need for further research to better understand the psychological and emotional impact that DMT has on adults with DS.

Keywords: DS, Dance/Movement Therapy, well-being, quality of life, self-identity, physical exercise, special needs, special education, expressive therapies, expressive arts.

Author Identity Statement: The author identifies as a straight, White woman from Los Angeles, California of mixed European ancestry.

Introduction

Down syndrome (DS) is the most commonly occurring chromosomal condition in the United States. Its signature extra chromosome modifies the course of each individual's development and causes physical characteristics associated with DS. Children born with this condition are faced with developmental and cognitive delays that affect their ability to learn new concepts, skills, and activities (Albin, 2016). As children with DS enter adulthood, they encounter a new set of challenges, such as memory problems, a decline in vision and hearing, obesity, and depression (Clark, 2011). The average lifespan today of a person with DS is approximately 60 years. The population of individuals with DS in the United States is estimated to be about 407,236 (Global Down Syndrome Foundation, 2021).

Dance used therapeutically as dance/movement therapy (DMT) has been found to confer numerous benefits for adults with DS to help them overcome the given challenges they face as they age. The American Dance Therapy Association (ADTA) defines DMT as “the psychotherapeutic use of movement to promote emotional, social, cognitive, and physical integration of the individual, for the purpose of improving health and well-being” (ADTA, 2020, para. 1). While DMT improves physical fitness, individuals with DS in DMT programs are encouraged to freely express their thoughts and emotions. As a form of creative-body-oriented psychotherapy, DMT uses dance and movement in the form of interventions with verbal and nonverbal expression to support individuals to feel both emotionally and physically content as well as more spirited and energetic (Bräuninger, 2012). Thus, by combining the physical benefits of dance with the cognitive

and emotional benefits of therapy using DMT, individuals with DS can continue to be challenged and stimulated to lead healthier lives.

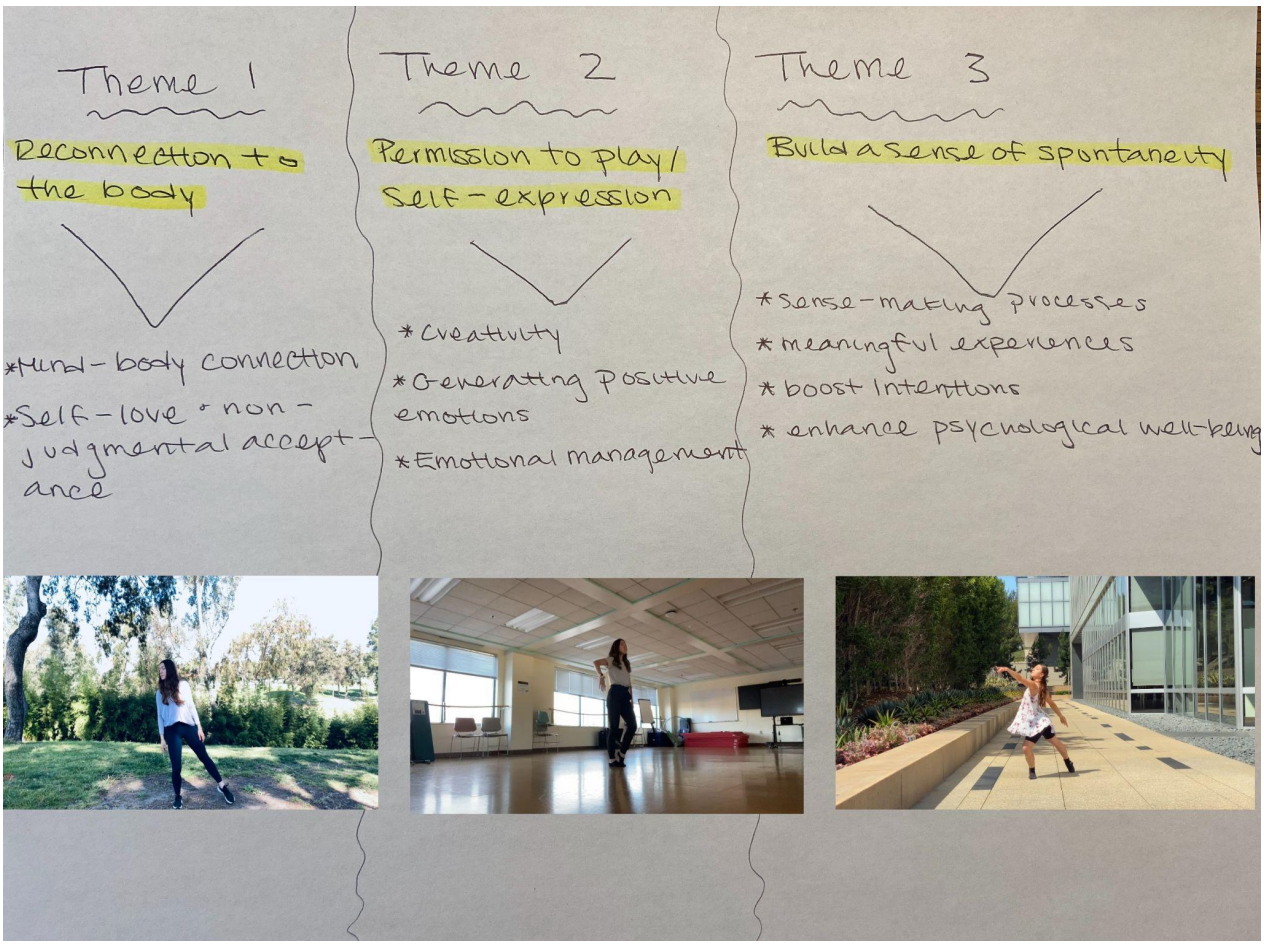
While studies have established that exercise has a positive impact on adults with DS, a comprehensive review is lacking in the sub-area of psychological and emotional health and the use of DMT for this population. This thesis examines empirical and phenomenological research found in peer-reviewed articles, juried journals, theses, and dissertations which address using DMT as a form of treatment, to investigate if improved psychological and emotional states in adults with DS occurs. Subheadings are used to indicate and identify different aspects of the numerous psychological and emotional benefits of using DMT in this population. The goal of this thesis is to provide an overview and basis upon which to advocate for greater DMT resources for adults with DS, using DMT and expressive therapies as therapeutic treatment.

The resources used to locate information included databases available through the Lesley library, ProQuest, and Psychinfo. String searches were used to locate information in peer-reviewed and juried journals for a comprehensive literature review that pertained to adults with DS and DMT. The searches included phrases such as DS and Physical Exercise, DS and DMT, DMT and Special Needs, DS and Aging, DS and Special Education, DS and Dance, DS and Music, DS and Expressive Therapies, and DS and Expressive Arts. From these phrases, keywords emerged that structured this paper; DS, dance/movement therapy, well-being, quality of life, self-identity, physical exercise, special needs, special education, expressive therapies. I also engaged in heuristic self-reflection, using movement labs taking videos of myself to explore movements that corresponded to the keywords. I reviewed the videos to select still shots of the

movements. I then identified words, phrases, or reflections that came to mind when reviewing the still shots and organized repeated words, phrases, or reflections into themes within a journal, adding five more categories (see Figure 1). I added this information to the topics discovered within the literature to create the headings and subheadings used in this paper to create my final categories for review: Major topics addressed in this review are: Physical Health and Physical Therapy, Dance/Movement Therapy, Self-Identity, Well-Being and Quality of Life, and Additional Therapeutic Arts.

Figure 1

Data Assessment Process



Literature Review

Physical Activity

In recent years, approximately 45% of male children and 56% of female children with DS have been found to be overweight (Albin, 2016). A report from 2009 found that 58% of children with DS did not meet the recommended 60 minutes of physical activity per day, which is approximately triple the rate of their typically-developing counterparts (Bryden et al., 2015). Children born with DS have an increased risk of developing thyroid conditions, hearing impairments, congenital heart defects, early onset of Alzheimer's disease, respiratory issues, and obesity. They also have an increased risk of developing hypotonia, small stature, and loose ligaments that cause joint instability, which can cause slow development and influence the rate of gross motor development (Snyder, 2018).

However, even though physical activity is important for individuals with DS, due to certain developmental delays and physical characteristics, individuals with DS often participate at lower levels of physical activity compared to individuals without DS (Swinford, 2012). Research has shown that many children and adults with DS do not participate in the recommended amount of physical activity per week (Snyder, 2018). Research also shows that as individuals with DS age, they become less active and that inactivity diminishes their quality of life on both physical and cognitive levels. When children with DS transition into adulthood, they become less involved with school activities despite encouragement from teachers, parents, and peers, and they fail to transition successfully to community-based recreational activities (Van Deren, 2010). Physical activity however, is vital for their overall development as the current research

states that, “using movement as an intervention for children with DS can support the development of their quality of movement and the relationship it has to social development, emotional development, cognitive development, and inclusion” (Albin, 2016, p. 59).

Today, individuals with DS are leading much healthier and longer lives than in previous generations. Despite increased longevity,, they continue to face daily physical and emotional challenges such as health issues including obesity, hypotonia, vision and hearing deficits, memory dysfunction, and even depression that interfere with everyday tasks and activities (Clark, 2011). Although physical activity and exercise help to alleviate these health concerns, studies have shown a lack of motivation and a general dislike of physical activity among individuals with DS population (Dodd et al., 2010). Thus, it is vital for individuals with DS to engage in physical activity at all stages of development to minimize acquiring numerous adverse health conditions.

Well-being and Physical Health

Physical activity improves mood, and symptoms of anxiety and depression suffered by young children that could continue to be exacerbated into adulthood if left untreated. Additionally, participation in physical exercise often leads to improved levels of well-being and physical health. Children diagnosed with intellectual and/or developmental disabilities are posed with additional physical challenges that can be impacted by below age-level performance in typical motor skills (Canfield, 2019). Proper skill development can result from involvement through regular physical education, sports, and exercise. When individuals are encouraged to participate in recurring fitness activities, improvements can occur in hand-eye coordination, dexterity, flexibility, muscle

strength, endurance, and cardiovascular efficiency. By engaging in enhanced physical health and the development of improved motor skills, these individuals can combat health concerns such as obesity and other complications mentioned above that they may face.

Regular exposure to exercise through physical education classes offers numerous benefits for a child's mind, as regular exercise is linked to improvements in self-esteem, social awareness, and self-confidence (Canfield, 2019). It has been found that exercise programs have the potential to positively affect the overall health of adults with DS, thereby increasing their quality of life and longevity (Barnhart et al., 2007). Physical activity additionally benefits the well-being of individuals and reduces the risk of chronic diseases (Clark, 2011). There are other benefits from physical activity for children and adults, such as improved health, increased self-esteem, prevention of chronic disease, and opportunities for social interaction (Albin, 2016).

Physical Activity and Access

A study was conducted by Barr and Shields (2011), consisting of twenty parents of children with DS between the ages of two and seventeen, who were interviewed to examine what key factors were barriers to physical activity for their children. The reasons for poor involvement in physical activity among children with DS included conditions commonly associated with DS, such as obesity, congenital heart defects, and communication impairments. Other conditions included spinal problems, hearing deficits, asthma, vision impairments, chest and ear infections, and leukemia. It is widely acknowledged that exercise opportunities for adults with disabilities or specifically DS are lacking and most research has shown that those with physical and/or intellectual

deficits may have reduced opportunities for social interaction and stimulation (Albin, 2016).

Children with DS are at an unfortunate disadvantage because they may not be given the opportunity to participate in activities based on their perceived physical abilities and social skills. Often, the reason these children may not participate in physical activity is due to there not being any appropriate programs for them. Due to these circumstances, children with DS may not acquire certain developmental skills or have access to important life chances and opportunities. Therefore, certain skills need to be implemented as forms of therapy in any educational setting for children with DS that fosters development such as climbing, jumping, running, and balancing. In addition to these basic movement necessities, concepts of body awareness and spatial awareness need to be introduced into therapy as well (Albin, 2016).

Decreased interest in physical activity is found among adults with DS. In general, unlike children with DS, adults with DS are typically sedentary, as many do not participate in the recommended levels of physical activity per week (Snyder, 2018). Dodd et al. (2010) conducted a study that explored the facilitators and barriers to physical activity, in which semi-structured interviews were conducted from a sampling of eighteen participants. Six of the participants were adults with DS, and the twelve remaining consisted of the parents of the adults with DS and employees of the day programs the adults attended. According to Dodd et al. (2010), the parents of the adults with DS reported the biggest barrier in physical activity participation for adults with DS was the lack of support they were experiencing. In contrast, most of the adults with DS in the study stated they did not want to participate in physical activity due to lack of motivation,

poor concentration, poor attention span, and experiencing a general dislike for the activities or exercise requiring physical effort. The adults with DS also expressed experiencing uncomfortable and unpleasant bodily sensations as reasons for not wanting to engage in the physical activity exercises. Therefore, the results from the study suggest that a network of support to act as facilitators and remove barriers is essential for their physical activity involvement Dodd et al. (2010).

A study was conducted by Roll and Bowers (2019) that focused on families who lived with an individual with DS. These individuals were interviewed regarding their understanding and use of available social support networks. Research showed two different approaches for building networks: (1) The "building approach" (p. 136), which built social support networks from family members and close friends, and (2) the "connecting approach" (p. 140), which built support networks that created opportunities for individuals with DS through professional services within the community. The findings showed that most parents used the "building approach" to create opportunities for their family members with DS…Only one-third of the families used the "connecting approach" to find independent living arrangements (2019). Given that most families do not seek outside resources for assistance, it is critical for the providers of services such as dance therapy to make families aware they are available.

To encourage adult individuals with DS to engage in more physical activity within their communities, it was suggested that integrated dance be introduced to public schools within theater arts programs for those with disabilities (Hickey-Moody, 2017). Additionally, the use of DMT in special needs classrooms is just beginning to grow its curriculum. In one study conducted by Devereaux (2017), thirteen special needs

educators were interviewed at a public school which offered DMT in its curriculum. The students with special needs were primarily children with autism spectrum disorder (ASD), one child with DS, and another with cerebral palsy. Their functional abilities varied. Open-ended questions were asked regarding the educators' role in the DMT sessions, their understanding of the purpose of DMT, and their observations about the influence of DMT on student behavior, symptoms, and academic gain. This research found benefits from using DMT in the curriculum that included (1) improved student regulatory behavior as well as on-task behavior and transitions counting as emotional regulation, (2) assisted with meeting individual needs within a group experience, (3) positively impacted student sensory systems, and (4) determined that the time, duration, and space of the DMT session influenced its long-term benefits (Devereaux, 2017). Thus, classroom inclusion of DMT in public schools would provide benefits to individuals with DS otherwise not available unless their families provided them with private dance lessons.

It is essential to continue to seek ways to enrich the quality of life for adults with DS due to their numerous challenges. The availability and use of DMT is an accessible resource. Social justice issues are also pivotal to ensure individuals with DS have proper care, resources, and services, especially as they age and begin to confront cognitive declines. Further research needs to be conducted to investigate the adequacy of overall service availability, which includes education, social networks, advocacy, and community housing. Steps also need to be taken to develop creative funding for families caring for individuals with DS. Moreover, longitudinal studies and qualitative interviews must be included to expand the empirical knowledge of family caregivers and other residential

care and service providers by suggesting interventions that contribute to positive results (Nevel, 2010).

Physical Health and Physical Therapy

Physical activity and physical therapy are both beneficial and successful for individuals with DS. However, physical activity and physical therapy focus heavily on the mechanical needs and less on the whole experience. This is due in part to physical therapy administering one-on-one sessions of compilations of exercises, which may cause individuals with DS to become disengaged and lose interest because of the repetitive and tedious nature (Clark, 2011). There is a consistent lack of motivation, lack of interest, and decreased levels of social participation identified in physical activity for individuals with DS. These individuals are more engaged when participating in something they enjoy and that is more interactive; thus, physical activity and physical therapy may not be the number one option in supporting their overall health and well-being (Clark, 2011).

When dance is added into the physical therapy curriculum, there is an increased potential for a beneficial outcome. A research study conducted by Cosma el al. (2017) focused on establishing an improvement strategy for motor ability in individuals with DS and identifying positive influences. For eight months, twelve individuals with DS (five girls and seven boys) participated three times a week in dance sessions. Techniques were applied from contemporary dance and music improvisation exercises. Subjects were tested before and after, following the evolution of the subjects during this period. The applied tests were the *Stand up and go* (the individual gets up from the chair; maintained orthostatic for few seconds; moves to the wall (3m); turns 360º, without touching the wall; returns in front of the chair; turns 360º, and sits on the chair); the *Tinetti walk test*,

(an analysis of some components of walking that can be done at the subject's usual speed or at high speed. The test includes the growth of body balance, the ability to increase the walk's speed, and the walking route deviation); the *Climbing and going down the stairs test* (where the subject climbs several steps until tiredness or inability to climb appears. At that time, the test is stopped and the number of steps that they climbed was recorded); lastly, the *Romberg test* (investigating balance in the standing position with legs closed, upper limbs beside trunk, and is executed with the eyes opened and closed. It is conducted for 60 seconds for the loss or the attempts of keeping the equilibrium (recoveries) through excessive oscillations or stepping). Results showed a statistical improvement on all tests comparing the final to initial tests performed by the subjects Cosma et al. (2017). Likewise, it has been scientifically shown that the lack of physical exercise from the lifestyle of those with DS may increase the risk of health problems such as obesity, diabetes, or Alzheimer's disease, which movement and dance help mitigate (2017).

Dance and Well-being

Dance has been shown to be beneficial specifically for individuals with DS. Research has shown that specific teaching approaches can significantly affect the development of individuals with DS in creative aspects of the curriculum, such as music, movement, and dance (Cosma et al., 2017). Overall, dance is an enjoyable, multidimensional activity and art form that positively impacts several aspects of an individuals' well-being. Dance promotes physical and emotional well-being, acts as a beneficial coping mechanism for stress reduction, and improves self-esteem and self-confidence (Bongard et al., 2010).

Bongard et al. (2010) conducted an exploratory research study investigating the benefits of dance on the general population to understand the impact of amateur dancing on their well-being. An online survey was provided to 475 non-professional adult dancers (304 females and 171 males), who reported having experience in a vast range of dance genres. The survey evaluated the participants' perceived benefits from dance. Their study revealed that dancing can positively benefit well-being in regard to emotional and physical health; it can increase self-esteem and encourage good coping strategies. Based on the evidence from the online survey results, the highest level of agreement among the participants was seventy one percent and corresponded to the statement "dancing improves my balance and bodily awareness" (p. 4). Meanwhile, the lowest level of strong agreement among respondents was sixteen percent and found in relation to the statement "dance gives me a strong feeling of the spiritual dimension of life" (p. 4).

Dancing is one of the most accessible forms of exercise for individuals of all ages and capabilities (Cosma et al., 2017). Dance is also a performing art, is valued as a means of self-expression, and acts as an important pathway to explore individuality across all cultures. This activity combines movement with musical accompaniment, which leads to an increase in physical activity and social participation (2017). Dance allows children and adults to learn important life skills that are extended beyond the dance studio. Dancers learn necessary skills such as discipline, commitment, creative thinking, and work ethic. Self-confidence is also exhibited through dance training, as individuals are taught to be resilient, how to master new goals, and how to learn to apply themselves and accomplish many tasks. Dance teaches children rhythm, music, and beat, which helps to develop a better understanding of spatial relationships (Snyder, 2018).

It is vital that children engage in a therapy program that is specifically tailored to their needs that also incorporates parents and family as part of their support system. When families are involved, children are more likely to participate and engage as they typically view their family as role models. Children with DS are also influenced by peers, so therapy programs would need to focus on individual and group work (Albin, 2016). For DMT to also be an effective form of therapy, it needs to relate to other areas of the child's life. If the concepts are not relatable, the child then may not be willing to participate and experience the desired connection offered from DMT, and therefore DMT might not end up being effective (Albin, 2016). It is also crucial that the DMT therapist become familiar with the unique movement patterns that children with DS often develop, including flat, turned-out feet, stiff knees, rounded back, and walking with rotating hips.

The goal of the DMT program would support building and strengthening the muscle groups that are essential for proper posture, alignment, and movement. As mentioned previously, physical activity is beneficial for children and adults with DS but only focuses on the mechanical needs. DMT programs are more engaging for individuals with DS, as they incorporate the musical component that helps them to build a sense of rhythm, while implementing choreography and specific movement exercises that are fun. DMT is a fun and interactive way for them to strengthen their muscles, while also working on critical skills such as balancing, skipping, jumping, and walking properly. These focus points target certain muscle groups and promote the involvement of the entire body (Clark, 2011).

Dance/Movement Therapy

Dance has been a significant part of human society dating back to the earliest tribal communities, and since that time it has taken on many forms and has served countless purposes (Mastin, 2015). Since early human history, dance has also been a means of healing that has been attributed to dance activities (Bongard et al., 2010). In recent history, dance has been used more in therapeutic interventions for individuals with an array of problems, such as depression, Parkinson's disease, cancer, arthritis, neurotrauma, and cardiac insufficiency (Mastin, 2015). Dance is often used as a physical and psychological therapeutic intervention for individuals with disabilities as well as some illnesses such as cancer (Swinford, 2012). Individuals with disabilities enrich the field of dance because it allows more people with varied and diverse backgrounds and abilities to access the art form and physical activity. Most dance programs allow students a space to explore just being themselves, enable self-expression, and allow opportunities for getting to know more about themselves and their personal capabilities (Canfield, 2019). Dance has been known to have lasting powerful impacts on the special needs population and in sustaining a lasting impact on able-bodied children and adult perceptions (2019).

A leading definition of DMT is "the use of expressive movement and dance as a vehicle through which an individual can engage in the process of personal integration and growth" (Snyder, 2018, p. 11). DMT has existed since the 1950s, and the field continues to expand rapidly today. DMT is a pliable approach to therapy; it can change depending on the specific needs of an individual. DMT also incorporates repetition that "involves having the person undergo certain environmental and social interactions to enhance

normal brain function" (Albin, 2016, p. 3). Learning new skills and experiencing movements supports the development of the mind-body connection. This sensorimotor integration could improve motor skills, emotional processing, academic success, and language capabilities (Albin, 2016). Further, a common denominator has been found among DMT theories that focus on body movement as a manifestation of thoughts and feelings (Snyder, 2018). The benefits of implementing dance and movement to any given population have included developing an environment that allows individuals to share their unique experiences in relation to their personal symbolism and to elaborate on where relationships become visible through dancing together. A clinician who is facilitating a class can use their expertise to create an environment in which these feelings can be safely expressed, communicated, and acknowledged effectively.

Critical skills can be taught in a basic dance class for individuals with DS. Such classes tailored to the skills and the diverse needs of individuals with DS are included in an established program called United Dance. United Dance (2018) is a dance program founded by international ballet dancer Boris Richir, designed to meet the unique needs of individuals with DS. United Dance aims to share the love of dance and foster creativity by providing high quality, engaging, and thoughtfully designed programming in a safe, structured environment where individuals with DS and their families can experience the joys of dance (2018). Through the implementation of dance, students can build their self-expression, self-confidence, artistry, social, and leadership skills along with strength, coordination, balance, and motor skills. Another thing to note that is especially important is that all dance classes be taught by professional dancers trained in teaching specialized populations and accompanied by an assistant teacher, musician, a physical therapist

and/or health care professional. Classes are developed to be enjoyable and accessible for these individuals, as the curriculum specializes in addressing social, emotional, physical, and artistic growth. Classes are designed to take place for 60 minutes in a consistent six-part format including (1) a warm-up that prepares the body for movement through body/movement isolations while establishing orientation and the focus of class; (2) chair work that targets posture development, alignment, strength, balance and stability by practicing non-locomotor movement with opportunities for personal development; (3) floor work sequences practicing locomotor movement, patterns and pathways, development of coordination, laterality, and balance; (4) music work that develops a sense of rhythm, patterns, dynamics in music, expression, and emotions; (5) routine work that practices movement combinations and choreography with opportunities for improvisation, creativity, and self-expression while building community, relationships, and sense of self-efficacy, and (6) a cool down focusing on reorienting to leave class in establishing trust and predictability (United Dance, 2018).

Such programs as United Dance offer a safe and supportive environment for their students and constantly foster their well-being, quality of life, and self-identity through the highest level of dance education. Similarly, it was found that a 12-week Bharatanatyam dance therapy program offered to 30 children between the ages of five to 18 with DS found a 34-86% improvement in strength, 27-59% gains in cardio-respiratory fitness, 18-39% improvements on balance outcomes, and a 2-18% change in parameters in body composition (Parab, 2019, p. 17).

Dance, Western Culture, and Psychology

Dance is not only an art form, but it is also a means of connecting to cultural identities, a way of communicating, making religious connections, bonding with others, celebrating notable events, facilitating psychotherapy, and more (Mastin, 2015). Historically, dance has been a principal component of all human cultures. Modern Western culture, however, has categorized dance into two distinct parts, including folk dances performed by untrained dancers, and professional dances performed by individuals with specialized dance training before an audience of lay people (Chaiklin, 2009). In addition, various cultural factors, such as Cartesian dualism (which argues that there are two kinds of foundation: mental and physical) and the religious tenets of the major Western monotheisms, have led to a devaluing of dance in general and folk dance, with some groups going as far as to ban dance altogether (2009). Dance and other forms of musical expression are now practiced by a minority instead of the majority (Bongard et al., 2010). Both Cartesian dualism and monotheistic religions in Western culture view the body as separate from and inferior to the mind and/or spirit. The body is not seen as something to be celebrated, but something that must be strictly monitored and controlled by our higher faculties. However, the field of psychology has recently begun to deconstruct these perspectives.

There have been major advances in the field of neuroscience that have led to doubt the ideals of dualism (Mastin, 2015). Neuroscientists favor the monistic view of the mind-body problem, believing that once scientists develop a solid understanding of how the body and nervous system operate, then they will be able to explain thought and consciousness in authentic physical terms (Mastin, 2015).

Another emerging approach based on psychology characterizes dance as a primal, fundamental, and natural vital life force and uses Integrated Dance/Movement Psychotherapy (IDMP) to harmonize the complete personality, culminating in social restorative justice, by giving every individual a valid expression of their own 'story.' IDMP is based on traditional and emerging African dance and naturalistic movement vocabularies. Dance and music can be effectively employed as healing interventions for self-inquiry or critical thinking in education and personal development. In Africa, for example, dance and music have traditionally been used as therapeutic arts. Both are viewed as social vehicles where communities participate to achieve a state of health, regardless of ability or disability, creed, race, sex/sexual preference, age, or national origin. Dances of African origin such as the Maypole Dance were recommended and instructions for teaching the dance were provided, for use in public schools and community centers as a basis for individuals to better understand their own views and the feelings of others with regard to cultures in and outside the world around them (Brathwaite, 2017). Thus, the emerging perspectives now posit that the mind does not control the body, but the mind is seen to be composed and constituted by the body, turning Cartesianism on its head, and elevating the importance of movement and dance as fundamental to well-being.

The field of contemporary psychology has also studied the effects experienced by individuals who dance. Presently, there are two primary types of studies: The effects seen in healthy populations who attend dance classes as a leisure activity, and the effects of dance seen in clinical populations with physical or mental illnesses who attend dance classes as part of their treatment programs (Mastin, 2015). Initial investigations have

found that dance may be related to improving emotional, physical, and social well-being, and be an accurate strategy for coping with stress and improving self-esteem among untrained dancers Bongard et al., (2010). Again, dance has shown numerous potential benefits for several presenting concerns that individuals with intellectual and developmental disabilities face, such as obesity, anxiety, and depression.

Educational, Emotional, and Social Contexts

Perceived social support refers to an individual's assessment of the degree to which an interpersonal environment is supportive (Mastin, 2015). Two studies conducted below found that perceived social support and community within dance classes positively contributed to beneficial outcomes. Although not universal to all dance forms, interpersonal interactions are common to most forms of dance and are seen in dance training, from formal ballet classes to informal dance at dance clubs and parties. Dance often brings individuals together for monumental moments in our lives such as weddings, religious rituals, celebrations, etc. Psychological research into the effect of dance has begun to investigate the benefits of this communal aspect of the activity (2015).

Hevércia Silveira de Farias and Teixeira-Machado (2016) investigated the benefits of dance for individuals with DS. Their research included 12 participants with DS, four males and eight females, between 13-30 years old. Dance classes took place twice a week, lasting 60 minutes each, for 12 months, in a suitable classroom. The choreographic sequences in dance classes were aided by playful songs that encouraged communication and socialization of their participants. Classes were divided into three sections: warm-up (strength and body conditioning); choreographic compositions (body coordination, memory, perception, rhythm); relaxation (final stage). The choreographed

pieces were then prepared for public presentations. The study used the following scales to measure results: The Functional Independence Measure (FIM) in the following categories: Self Control, Sphincter Control, Mobility, Locomotion, Communication, Cognitive Function, Psychosocial Adjustments; the International Classification of Functioning, Disability and Health ICF scale developed by the World Health Organization, which ranked the health and health-related aspects besides environmental factors, including education, and social participation; and The Mini Mental State Examination (MMSE) to indicate cognitive status by evaluating place and time orientation, memory, attention and calculation, and ability to construct a sentence. After the dance lessons and public performance, repeat tests showed improvements in all categories and an increase in FIM scores: Before 65.5(7.34) and after 97.37(3.29) (Hevércia Silveira de Farias & Teixeira-Machado, 2016). This increase also indicated an improvement in independence alongside mobility, locomotion, communication, cognitive function, and psychosocial adjustments in the variables involving communication and social cognition, such as the aspects involved in the educational, emotional, and social components. Hevércia Silveira de Farias and Teixeira-Machado (2016) concluded that dance was a facilitator of independence for individuals with DS. It increased comprehension, learning, performance, and enabled communication, education, and interaction between those with DS and all other people in society. Dance was ultimately shown to provide autonomy and freedom of expression to individuals with DS, and by these means it improved their lives.

Self-Identity

Self-Esteem, Self-Confidence, and Self-Efficacy

Clinton (1988) showed that dance has been shown to positively influence self-confidence, self-esteem, and self-efficacy. A dance studio which teaches ballet, tap, and other classes, offered a class exclusively for those with disabilities that included students with DS. Baron, the instructor, who worked with Bob Fosse on Broadway, stated that her students have to work hard to learn simple routines, but "whatever they can accomplish, whatever little they can do, it makes them feel good. It gives them a sense of self-worth, self-accomplishment. They progress at their own rate according to what their special challenge is" (Clinton, 1988, p. 1). In addition to strengthening weak muscles, dance improves coordination and balance and reinforces physical therapy some students get in special schools…Self-confidence built in dance class also helps students function better elsewhere. Marie, a 20-year-old student with DS, was in the first class seven years ago. Now, adept at dance and gymnastics, she has developed her self-confidence and she has been able to get a job at a fast-food restaurant. Another parent whose pony-tailed 16-year-old child, with DS, Tara, started classes this year, said, "Physically and emotionally she has improved. If Tara has a stressful week in school, as soon as she comes here, she relaxes…it has done a lot for her self-esteem and has helped her make friends. It has been better for her than her psychologist" (p. 2). Similarly, another dance studio in Philadelphia, PA reported increased self-confidence in its dance class of handicapped children as they acquired a new skill. Their classes were tailored to meet each individual's needs by an occupational therapist who worked with the dance instructor to design a program for each child based on rhythm and movement. In

providing an opportunity for the handicapped to dance, the objective of the instructors was to use dance as an educational, therapeutic, and social tool, while focusing on the creative contribution each child can make Riedel (1987).

Crişan (2020) researched the effects of dancing in young people with DS through semi-structured interviews of individuals connected to them. The DS participants practiced dances such as ballet, waltz, zumba, tango, and therapeutic-based movement. Some of them demonstrated their skills in events specific to individuals with disabilities, but also at inclusive events, where they danced together with professional dancers in Romania, Moldava, and Italy. The effects of dancing included increases in self-esteem, relaxation, social inclusion, improved learning, and social skills, since the participants met a lot of people in various social settings which increased these specific effects. The study represented the correlation between the body and mind connection as a premise for individuals to seek movement approaches for a holistic experience of mental, emotional, and physical well-being and personal development (Crişan, 2020).

Bryden et al. (2015) undertook a phenomenological study to explore the lived experience of an individual with DS who participated in a six-week community-based dance program and also showed a significant increase in self esteem due to the class. The participant (pseudonym “Luke”) was a 21-year-old male with DS. The dance class took place once a week for 45 min. The program was inclusive to all children with disabilities, with students ranging in age from eight to 24 years. All were female identifying except Luke. The class began with a ballet-inspired warm-up, which included pliés, tendus, port de bras, sautés, and other ballet exercises. In all these exercises, students utilized one body part at a time, such as moving the arms in port de bras or bending the knees in plié.

The students also practiced simple traveling steps such as skips, walks, and runs. The students then practiced jazz and hip-hop-inspired movements such as shoulder isolations and knee bounces. Afterward, the students took turns traveling across the room in a more stylized fashion, such as walking and snapping their fingers at the same time. Next, the class practiced a dance routine for the recital at the end of the year. They practiced the choreography that they had learned in previous classes, and then the teacher added more steps to the dance. Toward the end of the class, the instructor Sue allowed the students to have free time to dance as they wished to songs suggested by the students. Sometimes they played games such as freeze dance (dance when the music plays and freeze when the music stops), while other times they made a circle and took turns dancing for their peers in the center. The class finished with each student taking turns dancing across the room to say thank you to the teacher and receiving a sticker for participating.

Because Luke had difficulty communicating verbally, the perspectives of his lived experience through the eyes of his instructor and parents were integral to the study. By exploring their perspectives of Luke's experience, the researchers gained insight into how a dance program affected not only the participant, but also the other individuals involved. Data was collected by sending questionnaires to those connected to Luke regarding his abilities and experience, followed by one-on-one interviews before and after the six-week program. The principal researcher also attended the first and last dance class of the six-week dance session in order to observe the class structure and Luke's participation in the class. Field notes about the dance class included information about the students, the teacher, and the volunteers, as well as how they interacted with each other (Bryden et al., 2015).

The findings of this study showed that both the instructor and Luke's mother believed that there were psychological benefits from his participation in the class. Luke exhibited increased self-esteem, self-confidence, body awareness, and the capacity to remember dance moves. Sue believed that his confidence was boosted from the positive feedback of his peers. Specifically, she felt that the class boosted Luke's self-confidence and self-assurance and that he was now able to realize his own potential in learning how to move his body in a new way, move in synchrony with others, and remember choreography. By attending the class and learning how to move his body to perform new dance steps, Luke's mother believed that Luke had increased body awareness and overall confidence while dancing. He may also have increased balance and coordination within the class, as observed by the dance instructor (Bryden et al., 2015). The researchers found this community dance class was highly beneficial for this young adult. The observations demonstrated an increase in his desire to continue dancing, along with his increased self-confidence, self-esteem, and body awareness. Additionally, Luke's experience in the class provided him with the resources allowing him to expand his social circle, engaged him cognitively, and encouraged him to become physically active.

Well-Being and Quality of Life

A recent research study by Barnet-Lopez et al. (2016) examined the improvement of emotional well-being regarding the quality of life in adults with intellectual disabilities (ID), including DS. Barnet-Lopez et al. (2016) demonstrated that DMT can be an effective approach when working with adults with ID and DS to increase their quality of life and in particular, their emotional well-being. The authors administered a study to assess the changes in emotional well-being of adults with ID and DS through a series of

twenty-six DMT sessions, where an intervention and control group were observed and contrasted (2016). The DMT sessions consisted of a dance warm-up, thematic development, and closure. Aspects of the sessions included body scheme, rhythms, balance, coordination, and improvisation, with abstract concepts as well including, self-concept, relationship, and identification of the diverse types of emotions. The participants were all asked to examine a pictogram before and after each session. The pictograms emphasized either happiness or sadness and were used to identify the moods of the participants. The human figure drawing (HFD) test was used at the beginning of the study and again three months later after the dance program was held to assess emotional well-being (2016). There were 30 emotional measures that highlighted worries and attitudes of the participants. The author explained that the emotional measures allowed for observation of the emotional patterns or difficulties, and higher scores on the HFD specified higher numbers of emotional difficulties. There were also 14 emotional measures that decreased in frequency after conclusion of the study. The measures represented emphasized the improvement in self-concept, interpersonal relationships, self-confidence, anxiety, body self-awareness, and the capability to identify emotions, which ultimately suggested an increase in emotional well-being. Self-confidence and self-concept improved in part due to the tiny emotional figure item, along with decreased anxiety and lack of body acceptance for the participants. This study suggests that the DMT program improved the emotional well-being for its participants with ID and DS (2016).

The stressors on well-being and identity development for individuals with DS are well documented in the literature (French & Jones, 2019). Low self-esteem is common in

this population. DMT works to maximize the social and emotional experiences and feelings of adults with DS. In dance, positions and movements indicate emotional states; therefore, trained dancers are taught to be aware of their emotional states. Eventually, they learn that if they use the body in a certain way, they are going to get a certain reaction, as emotions are stirred through the movement.

Similarly, Zemcik (2014) found increased self-esteem, self-confidence, self-expression, and pride increased in adults with DS following workshops that taught dancing in a safe space for creative exploration. The workshops, which were designed to support the social and emotional well-being of individuals with DS, fueled their personal growth because they were able to express themselves creatively in an environment that was empowering, safe, and non-judgmental. This article focused on an individual with DS and how her engagement through DMT inspired her electric energy and positive smile as she performed. Zemcik (2014) advised when working with individuals with DS, it is crucial to focus on the individual's abilities, not disabilities, as stigma tends to cloud neurotypical people's judgments and perceptions of those with disabilities. Without stigma, individuals with DS can achieve more effective results by engaging in dance, as it greatly influences and enhances their cognitive and emotional functioning.

Additional Therapeutic Arts: Music, Arts & Crafts, Voice, Acting

Dance literature notes that whether it is a child or adult receiving DMT, music plays a large role in the experience. The dance/movement therapist can coordinate choreography and movement with music to strengthen an individual's muscles, while also stimulating their learning and knowledge of rhythm and musicality. Incorporating music into DMT sessions has been found to positively benefit in bringing forward positive

feelings and emotions, which ultimately makes the experience more enjoyable and fulfilling. Therefore, DMT sessions are more successful with music as part of the overall experience (Clark, 2011).

Schwartz (2019) conducted a study where an occupational therapist and physiotherapist created an interprofessional dance program for individuals with developmental disabilities. Participants were selected by the school principal and teachers, and Group A consisted of six children ranging from 8-11. Group B included five to seven adults from 18-35 who were in the school's vocational program. Each group was given 20 to 30 minute dance sessions twice a week for a month. It was noted that the Group B participants had no physical activities as part of their school day. The objective of the study was to use dance to increase the participants' skills such as balance, coordination, attention, and social interaction, occupational performance, and team sport participation. Observational notes showed that those in Group B had a low activity tolerance and could only engage in 25-minute sessions per week. It was also found that all participants were more willing to try new movements by incorporating the interests of each participant into the sessions (e.g., music preferences), as a tool to have them engaged more successfully (Schwartz, 2019).

Individuals with DS may have a special affinity for music. The first reference to specific musical ability in DS was made by Fraser and Mitchell in 1896. Since then, writers, in both popular and professional literature have continued to associate a fondness for music and a sense of time and rhythm with DS (Engler, 1949; Hallas, 1976; Lapage, 1911; Smith & Berg, 1976). Cantor and Girardeau (1959), and later Stratford and Ching (1983), carried out trials to scrutinize the claims made about special musical ability in

individuals with DS. Their investigations neither confirmed nor denied this notion. Stratford and Ching (1983) examined how individuals with DS performed during rhythmic discrimination and reproduction tasks respectively. They compared 10 intellectually disabled participants, 10 intellectually disabled children with DS, and 10 normal children who shadowed three different rhythms of increasing complexity; the researchers used a metal rod and tapped along with the stimuli on a metal plate. Although the response of the individuals with DS in the DS group and normal groups were remarkably similar in their ability to maintain a rhythmic pattern congruent with the stimulus decreased as the rhythm became more complicated, Stratford and Ching were "reluctant to make fundamental claims, based on the evidence….The review also found significant gains in motor skills in disabled individuals when music was paired with movement" (Hooper et al., 2008, p. 3). Only James et al. (1985) from this source introduced a program of music and movement to 12 participants with severe or profound intellectual disability and a control group (n = 12), considered motor skill development. The program paired auditory and vestibular stimulation (i.e., slow swaying, spinning, bouncing). The vestibular stimulation was presented so that it coincided with the beat of the music, and it "facilitated significant gains in motor skills for the experimental group" (Hooper et al., 2008, p.8).

Furthermore, Castellary-Lopez and colleagues (2021) also contributed to this field of combined arts approaches. They focused on the benefits of movement activities combined with music, vocal, instrumental, and listening activities that were found to promote the emotional development of people with DS. Eight adults with DS between the ages of 20 and 45 were selected to determine if music raised awareness of emotion,

contributed to the identification of emotions, or improved the control of emotions in the participants, who were shown images of facial expressions showing joy, fear, sadness, anger, calm, and love during eight 55-minute sessions. The participants were tested at the beginning and end of the sessions, and the researchers found that only joy, fear, and calm were recognized at the beginning, though all were recognized during the final test. It was found that the activities that enabled the greatest recognition of emotions were movement, assembly, vocal interpretation, drawing, narration, and dance. Similarly, a pilot study conducted by McGuire et al. (2019) measured the effects of an adapted dance program on motor abilities and participation in six children with DS. The study integrated an eleven-year-old girl into an adapted dance program that included dance, voice, and acting, which resulted in improved quality of life and motor abilities.

Lastly, Leah Jones, an individual with DS, founded “Positive You,” an arts and crafts-based training program for learning-disabled individuals, to build their self-esteem and provide business opportunities. “Positive You” uses arts and crafts to enhance self-expression to overcome a lack of self-advocacy in this population. Research showed learning-disabled individuals experienced low self-esteem due to social nonacceptance and risk aversion from their families and social supports, and this motivated Leah to develop her program. “Positive You” has two formats: (1) A four-week program exploring the themes, Who Am I?, Confidence, Self-Esteem and Assertiveness, attended by professionals who support the disabled, and (2) One-day workshops for the learning-disabled that include the topics “Good Support/Bad Support,” which provides a cut-out human figure to decorate and identify which social supports work and which don’t work; “Framing Your Dreams,” where photos of each individual are decorated with

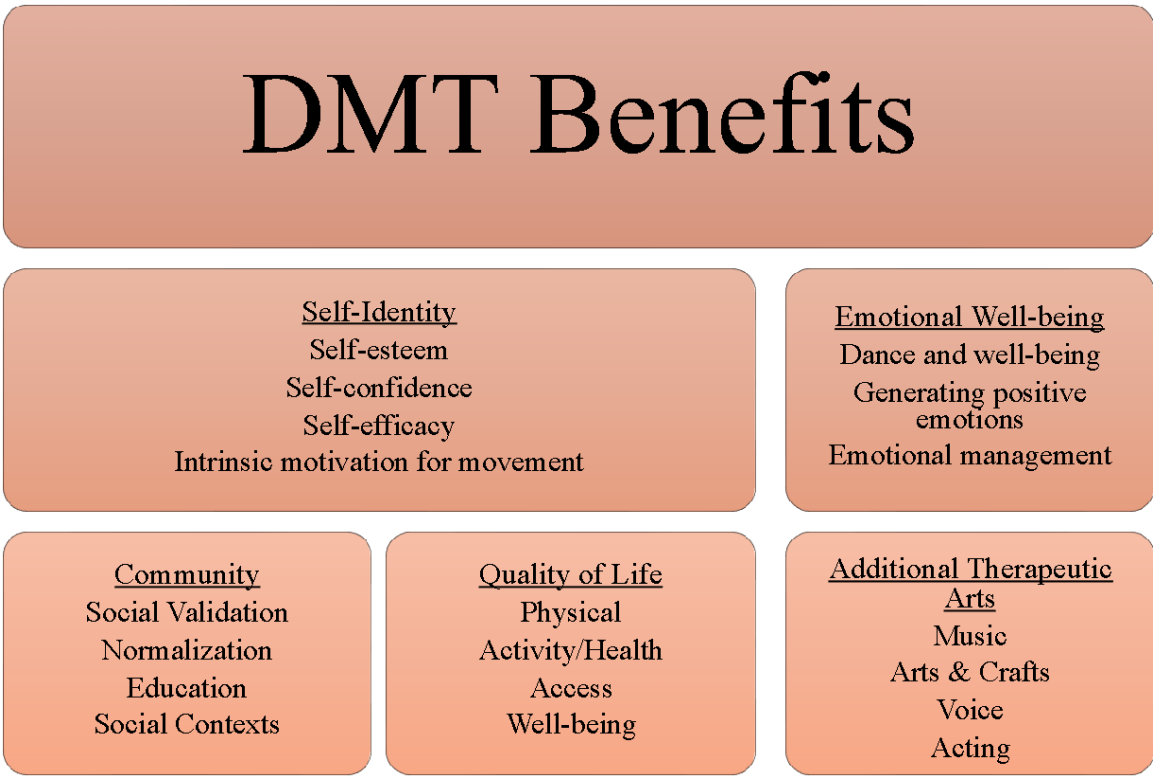
their goals; and "Celebrate Me," where a decorative pendant is created of each individual's proudest moments (French & Jones, 2019). Leah is a rare example of an individual with DS founding a program to advocate for increased self-esteem, independence, and entrepreneurship for individuals with DS based on their talents!

Synthesizing the Findings into a Theoretical Model

Upon completing my own data assessment process (see Figure 1, infra p.5), I was able to create a theoretical framework that could be considered when working with adults with DS to identify further DMT research and opportunities for this population (see Figure 2). The five domains emerged as I combined the information obtained from the movement-based data, journaling, and note gathering in Figure 1, and combined it with themes found in the literature. The domains were used to organize the themes in this thesis and represent ideas organized into domains to consider when researching or working with adults with DS. I believe the five domains also present a foundation for treatment and, depending on the client, could be tailored to that individual or group for therapeutic treatment within expressive therapies.

Figure 2

A Synthesis of the Five Domains into a Theoretical Framework for DMT and DS



Discussion

The purpose of this literature review was to assess whether DMT could be beneficial to adults with DS. The research showed numerous health risks associated with DS especially among adults, and illustrates how DMT can minimize those health risks while offering enrichments on both physical and psychological levels. The results from the review promoted the use of DMT as a form of therapeutic care for adults with DS and showed that DMT along with related expressive arts, enhanced their physical, emotional, and psychological well-being, and strengthened their sense of self-identity. These areas in DMT can be considered in a therapeutic framework offering five major domains of

Self-Identity, Emotional Well-being, Community, Quality of Life, and Additional Therapeutic Arts.

Statistics establish that children with DS need to be taught the importance of living healthier lifestyles that include daily exercise. Albin (2016) reports that 45% of males and 56% of female DS children are overweight. Bryden et al. (2015), Snyder (2012), and Swinford (2012) found that 58% of DS children did not meet minimum exercise standards per day. Albin (2016) states that physical activity is needed for proper development in DS children, as it supports their cognitive, emotional, and social development. Given the health challenges that individuals with DS face, which according to Clark (2011) and Snyder (2018) include risks of thyroid conditions, hearing and vision deficits, congenital heart defects, respiratory issues, memory dysfunction, early Alzheimer's and obesity, early intervention is a necessity. Additionally, Canfield (2019) states that children with DS also have poor motor skills, and Dodd (2010) advocates for consistent exercise to improve them. Thus, where a lack of exercise exacerbates these health issues and contributes to poor motor skills, increased physical activity is warranted. Barnhart et al. (2007) states that exercise could increase the life and longevity of adults with DS.

Dodd (2010), Van Doren (2010), and Albin (2016) found that as DS children age, they become less active and are largely uninvolved in community-based activities. Barr and Shields (2011) and Albin (2016) determined this increasing inactivity was due to a lack of exercise opportunities. To counter this trend, Cosma et al. (2017) recommends dance for adults with DS, because it is one of the most accessible forms of exercise for individuals of all ages and capabilities. Nevel (2010) specifically recommends DMT for

adults with DS due to its therapeutic nature given the numerous physical and intellectual challenges they face. While it is established that dance and DMT benefit adults with DS, Hickey-Moody (2017) discovered many families with a DS member lack knowledge of where to obtain dance training. According to Albin (2016) there are insufficient physical activities designed for DS children. Compounding this, Hickey-Moody (2017) found families lacked knowledge of available community resources for their DS members. Due to this, Hickey-Moody (2017) advocated for dance in public schools to increase physical activity for individuals with DS, as did Brathwaite (2017) who recommended the use of public schools to deliver IDMP as a therapeutic for everyone. Public school dance classes for adolescents and adults including those with DS would fulfill a needed requirement for this population and would improve their health. DS adults might also be more compelled to engage in dance and other physical activities if as children they were offered these activities in a public school or community center. Exercise for all people would help to maintain physical and psychological functionality as they age, and the need is greatest for adults with DS.

The Hooper et al. (2008) article establishes that music and movement are widely recognized as having positive contributions to the physical and emotional well-being of adults with DS. Findings of significant gains in motor skills were made when music is paired with movement (Hooper et al., 2008). The Catellary-Lopez (2021) study found improved motor abilities and quality of life in an 11-year-old girl who was placed in an adapted dance program that included voice and acting. The benefits of combining music with dance are numerous: Snyder (2018) states that dance is found to teach children rhythm, music, and beat, plus helped understand spatial relationships; Clark (2011) notes

that DMT therapy coordinates movement with music to strengthen muscles groups needed for proper posture, alignment, for movement that enables balancing, skipping, jumping, and walking properly. He found that incorporating music made the experience more enjoyable, bringing forth positive feelings and emotions; Schwartz (2019) found that dance increased coordination, strength, endurance, and motor abilities, and that the DS participants in an interprofessional dance program were more willing to learn new dance movements when music was also used in a group setting; In a study by Catellary-Lopez (2021) dance with music was also found to raise awareness of emotions, identify emotions, and improve emotional control in adults with DS; and lastly, Hooper et al. (2008) suggests that individuals with DS may have a special affinity and talent for music and reproducing basic musical rhythm patterns based on a prior study by Stratford and Ching (2008). Thus, DMT when paired with music, provides adults with DS an enjoyable form of needed exercise combined with movement. The literature confirms that dancing to music strengthens muscles, improves motor skills, teaches proper dance alignment and technique, rhythm, musicality, and offers adults with DS a form of exercise, while teaching its participants the importance of movement and fitness.

Dance increases the sense of well-being, which leads to increased self-esteem. It was noted that physical activity improves mood and symptoms of anxiety and depression, which can be exacerbated into adulthood if left untreated (Canfield, 2019). Bongard et al. (2010) showed that dance was found to promote well-being by providing coping mechanisms for stress reduction, thereby improving self-esteem and self-confidence. Specifically, dance improves physical and emotional health, and that causes a sense of well-being. Where there is well-being, increased self-confidence and self-esteem can

develop. According to Schwartz (2019), it's established that dance improves self-awareness and imparts social communication skills for individuals with DS such as empathy, expression, increased self-esteem, and self-confidence. Clinton (1988) found that improved self-confidence and self-esteem also occurs in adults with DS when they learn and execute dance class routines successfully. This provides confidence that leads to tackling other new tasks and successfully completing them. Bryden et al. (2015), Barnet-Lopez et al. (2016), and Crispin (2020) also reported the same findings as Clinton, but added that the support and encouragement received by dance class peers contributes to improvements in self-esteem and confidence in adults with DS. As a dancer, the ability to successfully learn and execute dance movements provides a sense of self-mastery; the individual is able to experience overseeing and modifying their body and its actions, appearance, and health. Thus, dance supports positive self-perception and body imaging as its participants engage and build self-value. Furthermore, the increase in self-esteem leads to the development of self-identity in adults with DS. The DS adult who went on to pursue gymnastics after succeeding in dance class mentioned by Clinton (1988) discovered who she was and what she wanted to pursue. As Clinton (1988) explained, dance engenders a sense of self accomplishment and even small accomplishments limited to learning dance routines builds self-confidence allowing adults with DS to function better in all other endeavors.

Dance enables self-development in adults with DS because it allows individuals to express themselves in a safe environment without criticism. Zemcik (2014) describes dance as offering a safe space for creative exploration. Braitwaite (2017) understood the importance of using dance within his IDMP program to support creative self-expression

and recognised its therapeutic value. His examples of early African dances were both fundamental to the health and well-being of the individual and their community. Dance also facilitates sympathy and understanding toward other people and cultures by providing a common medium within which to exchange ideas and express emotion, which evoke feelings of togetherness and belonging. He also believes that using dance as a form of self-discovery to maintain health is very dependent on this supportive social context. Leah Jones (2019) recognized the importance of a supportive context as well in developing her “Positive You " business for intellectually challenged adults. Her stated intent was to use arts and crafts to help adults like her with DS, discover their aptitudes to build valuable life skills and create opportunities. As these DS adults discover their talents, they build self-identity, and use their talents to self-advocate for their best interests. The United Dance (2018) program is another example of a dance program for DS children aged five through eighteen, offering dance lessons in a safe and supportive environment that focuses on sparking their creative growth and artistry to develop increased self-confidence. DMT likewise provides a similar supportive environment for building self-confidence, self-esteem, and self-identity via social participation in dance which strives to reach those same goals.

More research on the role of DMT in adults with DS is needed. While there are empirical studies that conclusively test and found physical benefits from exercise or dance movement in adults with DS, more studies are needed within the domains regarding the psychological or emotional benefits of using DMT. Clark (2011) suggests using an interdisciplinary DMT approach incorporated into a medical treatment plan for health-related problems in adults with DS. This would allow the dance/movement

therapist to work with doctors in creating a care plan that addresses the specific health needs of each DS individual. He suggests that DMT in this setting could provide a nonverbal form of communication to use when declines in vision and hearing occur as these adults age. Albin (2016) supports tailoring a therapeutic program to the needs of each DS individual and including their parents and family for better participation. Barnet-Lopez et al. (2016) agrees that additional research is needed to show how DMT is beneficial in improving the emotional well-being and overall quality of life in both children and adults with DS. This additional research could close the research gap in this area and lead to increased funding and greater therapeutic opportunities for adults with DS using DMT treatment.

The intended outcome of this thesis was to encourage dance instructors, dance/movement therapists, physical therapists, expressive arts therapists, and mental health workers, to incorporate DMT as a suitable therapeutic intervention in their programs. This would increase the accessibility and availability of DMT programs for adults with DS, and provide opportunities for future research into DMT benefits in this population. The theoretical framework (see Figure 2) could act as a topical guide for clinical assessments and interventions. The literature supports offering DMT to adults with DS as it increases their lifespan and offers the creative possibility of a happier lifestyle. It enhances emotional well-being, and provides a greater sense of self-identity in individuals with DS. As strengthening self-identity leads to independence, social justice would support including the voices of adults with DS in discussions on how to best transform their current situations.

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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: Dance/Movement Therapy

Student's Name: Melissa Briggs

Type of Project: Thesis

Title: Examining the Role and Benefits of DMT in Adults with Down syndrome: A Critical Review of the Literature

Date of Graduation*:* *May 21st 2022*

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

Thesis Advisor*:* *Rebecca Zarate, Ph.D., MT-BC, AVPT*