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Impact of Dance and Dance Movement Therapy Interventions for Student Mental Health

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Abstract

This literature review collects advantages and disadvantages of dance and dance movement therapy interventions for school-aged children. As interest in mental health availability grows, the lack of time and resources for the services already in place requires creative solutions. Connections are made between the two modalities via the history of healing practices, Laban Movement Analysis, and mirroring. Data collected via fMRI scans, salivary samples, and self-reports from small samples sizes are present in some combinations or solo. The author concludes that a combination of the therapy provided by DMT and the physicality and creativity of dance interventions would potentially fill the mental health gap in schools.

Keywords: Dance Movement Therapy, Dance, School, Mental Health, School Interventions

Impact of Dance and Dance Movement Therapy Interventions for Student Mental Health

Introduction

There is growing interest in the United States regarding access to mental health services in schools as it is the number one resource for therapy available to children. Despite the presence of mental health resources in every school in the US, only 7.4% of the children receive regular mental health services (Child Mind Institute, 2015). School is where children spend the majority of their time, receive the most interaction with people outside of their home, and are taught the primary lessons they hold throughout their lives. It is a powerful force in the life of a child.

To understand how the school mental health system is not working, it is necessary to identify and understand the services already in place in school settings that address the students' mental, physical, and emotional wellbeing. These include, but are not limited to, school psychologists, school counselors, physical education classes, and afterschool activities. Each entity is part of the educational team that provides services to support the academic success of each child and is integral to a child's development.

School psychologists are present in schools to support the children, families, teachers, and school system. Their goal is to provide a safe and supportive learning environment for all children via their psychological expertise. With their support, they help with the child's "academic, social, behavioral, and emotional success" (Grapin & Kranzler, 2018, p. 4). According to a National Association of School Psychologists (NASP) survey of their members in 2015, more than 80% of school psychologists are employed full time in pre-K-12 public schools (Grapin & Kranzler, 2018). This same survey also found that schools psychologists spend the majority of their time working with special education students, both through assessments and in the development of Individualized Education Programs (IEP). School psychologists spent

significantly less time “providing mental and behavioral health services, consulting with school teams regarding school-wide programming, providing interventions and instructional support to develop academic skills, and developing schoolwide strategies to promote safe and supportive learning” (Grapin & Kranzler, 2018, p. 13). A school psychologist is required to have 3 years of training with 1,200 hours of supervision. In these years, they become knowledgeable of a broad range of student needs but are unable to contribute to the overall wellbeing of the student body, due to time constraints and/or their defined title in the school.

School counselors provide support in regard to peer relationships and family issues with the aim to aid in children's academic and developmental success (Flynn, 2018). A primary function of the counselor’s role is to provide support, information, and guidance regarding a student’s secondary education and future career options. The American School Counselor Association (ASCA) National Model explicitly states that it is not in the school counselor’s scope to provide long-term counseling. Instead, counselors refer students to outside community resources (Lambie et al., 2019). The focus of school counselors is on the academic success of all students and therefore limits their ability to provide mental health counseling. A study of school counselors found that 88% of those surveyed stated that they are not able to provide mental health counseling due to restrictions of the position. Many dance movement therapists (DMTs) are employed as school counselors, but their capacity to practice their range of knowledge is limited to the same degree as every other professional in this position.

School counselors are in touch with the entire school population to a greater degree than school psychologists given the nature of their work. It is unlikely that either school psychologists or counselors engage with the vast majority of students in the same way that a physical education

(PE) teacher would but may be in greater contact than an after-school program educator. This relationship correlates with the relationship between DMTs and dance teachers with students.

The history of mental health services as administered by school psychologists began in the 1950s (Florell, 2018). Prior to the formation of the NASP, the primary function of the psychologist in relation to school children was to assess children and to determine their intellectual, mental, and behavioral abilities. Basically, this determined *to which* level of education a student had access. Despite Florell's (2018) claim that the scope of the profession has widened to encompass a range of services, the NASP's survey of their own members found that school psychologists remain primarily focused on the assessment and IEP development for students with special needs.

The role of school counselors has shifted over the course of their history as well. When initially introduced into the school system, the focus was to provide "vocational and education guidance" (Lambie et al., 2019, p. 54). This evolved to mental health counseling services in the mid 20th century before moving back to a focus on academic success in the current model.

DMT and dance have had a presence in schools, in the form of school counselors, school dances, dance sections of gym class, and as after school activities. Given the pressures and the demands on teachers to focus on high test scores to access more funds, I propose that combining DMT into traditional dance classes in a school setting would provide low-cost access to both mental and physical health services that are major concerns in the children's health community.

There are many attributes that DMT and dance classes share. The most obvious connection being that DMT was born out of traditional western culture dance techniques. DMT was established as a defined therapeutic practice in the post medieval western world by dancers who utilized their training in mind-body awareness to work in the mental health field. The

American Dance Therapy Association (ADTA, n.d.) defines dance movement therapy as "the psychotherapeutic use of movement and dance to support intellectual, emotional, and motor functions of the body" (para. 1).

This literature review aims to unify the practice of dance interventions and dance movement therapy, rather than further divide the practices into their niche settings. The literature reviewed will examine the benefits and drawbacks of each modality on their own in the school setting before considering them together.

Literature Review

Dance is one of the oldest forms of healing known to humans (Goulimaris et al., 2005). This is thought to be evidenced from prehistoric cave paintings of what archeologists believe to be shamanic healing and in contemporary practices that have been passed down in traditional societies. Goulimaris et al. (2005) stated:

> In south Italy it is present in the dance of Tarantula, in Africa in the Voodoo ceremonies, the fraternity of Genoas in Morocco, in Bulgaria, in Romania, in India, in North Australia and in the islands of the Pacific in the ritual of fire walking. (para. 2)

According to Goulimaris et al., Plato wrote about the potential of healing movement on internal disorders. For example, Plato pointed to mothers' and nannies' use of rocking motions to soothe a baby when crying, and adults found healing through the manic chaos of dancing, drinking, and music to become "liberated from their internal oppositions and succeed their psychical balance (Laws 790-1 a-b)" (Goulimaris et al., 2005, para. 19).

Gradually the early, healing use of dance along with other traditional knowledge was abandoned in western societies as rational and science-based thinking began to transform the

post medieval western world. This was unfortunate as there was near-universal agreement of the therapeutic properties of dance and this form of healing continues to be regarded as a niche field, accessible only to the wealthy.

In a meta-analysis by Martin et al. (2018), the effectiveness of arts therapies and art interventions were shown to be particularly effective in the prevention of stress-related symptoms. With a total of 37 studies included for analysis, six studies on DMT or dance interventions were included, with two focusing directly on students. Eighty percent of the participants in all 37 studies reported or were found to have reduced stress symptoms, with the total rising to 90% when exclusively referring to arts therapies.

Despite the encouraging results of their meta-analysis, Martin et al. (2018) pointed out the problems that affect all research in the fields of arts therapies and arts interventions. The sample size of the majority of the studies are too small to accurately calculate for effect size, many studies did not include complete demographic data, and the wide range of creative interventions makes it impossible to draw any generalized results. Martin et al. (2018) suggested taking each artistic practice on its own to evaluate the merits and determine what about them is specifically working with each specific population. However, this may still not convince those who view these fields as lacking credibility. While the research is still in the early phases, there is a wealth of research on the impacts of DMT and dance activities improving the overall wellbeing of children. It is possible that further headway can be made by bringing the art on its own to the therapy practices to create more interest and faith in the field. It may be beneficial to create larger studies by extending, rather than narrowing, the scope of practice.

Dance Intervention Studies

The impact of dance's therapeutic properties has been recognized by British Health Secretary Matt Hancock, who in 2018 announced that doctors in the U.K. will be able to prescribe dance classes, along with other non-medical activities, for their patients (Wingenroth, 2018). The program is aimed at prevention rather than reaction, as Pereira & Marques-Pinto (2017) suggested and will likely be in full effect as of 2023 (Wingenroth, 2018).

Georgios et al. (2018) investigated the health-related quality of life (HRQoL) of fifth and sixth graders in Greece as affected by exposing one group to traditional PE and another to traditional Greek dances. To attain results, student's self-rated their HRQoL via the Kidscreen-52 Questionnaire. The participants of the traditional Greek dance program reported improvement in their "physical fitness, self-esteem and socialization, enhanced self-knowledge, well-being and positive mood" (Georgios et al., 2018, pp. 100–101) as opposed to the students in the standard PE program. The students in the dance intervention group also reported more interest and participation in the dance activities than in the PE group.

This study presents strong evidence regarding the positive impacts dance, specifically traditional Greek dance, can have on children. Nonetheless the study does appear to be somewhat flawed. Over the five-month period of the study, only one measurement was taken (the Kidscreen-52 Questionnaire). There does not appear to have been a pre-test given to the students or any data collected from the teachers, which does not fit in with the authors' stated investigation of the use of traditional dance as a means for "fulfilling purely educational goals" (Georgios et al., 2018, p. 97). Despite the lack of thoroughness, this study does appear to have collected data that supports the use of dance in schools.

Georgios et al. (2018) focused on the HRQoL rather than psychological symptoms, which is how dance activities and interventions are typically classified for study and practice. However,

the Kidscreen-52 Questionnaire section categories can easily be applied in a mental health capacity with titles such as Emotions, General Mood, and Self-perception. This falls in line with language of similar studies that are careful not to make any assertions of mental health improvement despite using measurements that contain such language. Nevertheless, future studies should focus on specific areas of mental health in dance interventions to support an assumption that dance interventions alone can be a form of therapy.

A study conducted in Australia by Olive et al. (2019) measured the mental and physical effectiveness of specialized Physical Education (PE) programs on elementary school children over a four-year period. In 2005, when the study began, Olive et al.'s research found that most PE programs were being taught by generalized teachers, meaning educators without specific PE training. This led them to question the effectiveness of PE courses in addition to their original hypothesis. Olive et al. cited numerous studies that found PE programs to be linked with interpersonal and academic improvement, but they found relatively few studies on the mental health benefits. Many consider it common knowledge that exercise has positive effects on mental health and it is assumed that PE carries the same effects; Olive et al.'s research was meant to fill this gap.

Olive et al.'s (2019) study included 821 children from 29 schools in Australia, with 13 receiving the intervention of a specialized four-year PE program. The 16 other schools were used as a control group and continued with their set PE curriculum. Research specifically monitored students' "1) depressive symptoms, (2) perceived stress, and (3) body dissatisfaction" (Olive et al., 2019, p. 1332), hypothesizing that the specialized PE group would see greater decreases in all three areas than the control group. Measurements of the three major areas of study were assessed via the Children's Depression Inventory (CDI), the Children's Stress Questionnaire (CSQ), and

Body Self-Esteem Scale for Children. Additional data was collected on students' physical health via pedometers for physical activity, shuttle runs for cardiovascular fitness, body composition tests, self-reporting of puberty changes, and the Australian Bureau of Statistics Socioeconomic Indexes for Areas to gauge socioeconomic status.

Initially, findings suggested that students in the intervention group showed a decrease in depressive and body dissatisfaction symptoms (Olive et al., 2019). In the long term however, they found these findings reversed; students in the control group showed fewer depressive symptoms and body dissatisfaction, while the girls in the intervention group's levels fell. Olive et al. theorized this may be due to the mixing of genders in PE classes and the intervention protocols did not change sufficiently to meet the needs of the student's development and interest level from year to year. The authors acknowledge that mental health is indeed affected by PE, in both positive and negative ways. Olive et al. suggested having PE teachers gain more training in mental health interventions in future research.

This study appears to negate the positive qualities often championed by PE, dance interventions, and DMT. The intervention utilized a variety of movement practices including yoga, gymnastics, sports, and games to improve students' mobility, physical awareness, and gross and fine motor skills, while taking the emphasis away from competition and included time for verbal processing (Olive et al., 2019. These attributes are consistently used to describe dance and DMT.

It would also have been interesting to have a better description of the processing structure, or some examples of answers included in the literature. Perhaps students felt that they were receiving mental health improvement from the classes and the depressive mood and body dissatisfaction was coming from other areas in their lives. It is important to acknowledge that

dance was not included in the curriculum, making this study not directly applicable to the effects on mental health of dance interventions or DMT in schools.

Dance Movement Therapy Studies

According to Moula et al. (2020), over 50% of expressive arts therapists in the UK are employed in educational settings, specifically to ease students' transitional difficulties. These encompass moving from "primary to secondary school, special to mainstream education" (Moula et al., 2020, para. 3) and/or familial transitions. Zubala & Karkou (2014) reported that 28% of working DMTs in the United Kingdom are in school settings with a total of 33% working with school-aged children, indicating the importance of providing mental health services in educational settings.

In their pilot study, Moula et al. (2020) studied the areas of student's lives that may or may not be affected by arts therapies interventions. A program of DMT was included along with other arts therapies (art, drama, music) to measure changes in children's HRQoL, "wellbeing; life functioning; emotional and behavioral difficulties; and sleep duration" (Moula et al., 2020, para. 10). Data was collected via questionnaires given to the students and teachers before, during, and after the interventions, including a 3-month, 6-month, and 12-month follow-up. This collection found a significant effect on wellbeing and life functioning, emotional and behavioral difficulties, and sleep duration at the 6-month follow-up testing. Unfortunately, due to the Covid-19 pandemic, data from the 12-month follow-up was not included due to low participation.

Moula et al.'s (2020) findings are quite significant because of the collection of quantitative, qualitative, and arts-based results, which is noteworthy considering the lack of such robust research in the arts therapies fields. Though this was a small pilot study, the data collected provided the researchers with the information necessary to increase the size of the participant

pool in their future studies. With a strong positive outcome in future research, DMT will likely gain recognition from the larger psychological field, allowing for an increase of interventions in school settings.

Looking more specifically at the reasoning or goal behind dance interventions, Wiedenhofer & Koch (2017) conducted a study observing goal-directed (EG) and non-goal-directed (CG) improvisational dance to identify their effects on "perceived stress, improved well-being, general self-efficacy, and body self-efficacy" (p. 11). Based on previous research by the authors it was hypothesized that the non-goal-directed group would experience no reduction or improvement in the study areas, while the goal-directed group would experience improvement in all categories.

Three sessions of the EG and CG interventions were run with a cumulative population of 57 students from SRH University in Heidelberg, Germany (Wiedenhofer & Koch, 2017). Participants were administered four pre- and post-tests; the PSQ30 questionnaire on perceived stress, the Heidelberg State Inventory (HSI) for well-being, the General Perceived Self-Efficacy Scale (GSE) for general self-efficacy, and the Body-Efficacy Scale (BSE) for body self-efficacy. Both the EG and CG groups lasted between 45-50 minutes with approximately 14:30 of continuous dancing over the length of four songs. The research found that non-goal-directed dance did "reduce participant's perceived stress, improved well-being, and general self-efficacy" (Wiedenhofer & Koch, 2017, p. 16) to a greater degree than the goal-directed group, but there was a significant reduction and increase, respectively, reported. Wiedenhofer & Koch (2017) concluded with the following theories:

> The effects can be explained by three different theories (a) mirror neuron research (e.g., Ferri et al., 2015; Gallese, 2001; Gallese, Fadiga, Fogassi, & Rizzolatti, 1996) claiming

> that goal-directedness versus non-goal-directedness makes a fundamental difference in the function of the brain, (b) dynamic systems theory claiming that in non-goal-directedness the organism is triggered to move in self-organization (Haken & Schiepek, 2006; Thelen & Smith, 1994), and (c) health psychology models claiming that in non-goal-directedness, control is completely internal, which may have fostered self-efficacy through increased perceived control. (p. 16)

Of course, there were several limitations to the study including small sample size, no randomization in groups, no long-term effects were considered, and the majority of the participating students were studying a form of psychology, some of whom were in the dance/movement therapy program (Wiedenhofer & Koch, 2017). Given these limitations, this research provides a solid argument for a wide range of dance and DMT interventions with students. Depending on the style the student prefers, they can participate in a more structured or more self-directed movement. Both are shown to reduce stress and increase well-being, which are important factors when considering applying these programs to all students.

Mindfulness, LMA, & Mirroring in DMT and Dance Interventions

Koch et al. (2019) theorized that the success of dance and DMT as a healing practice is due to their non-verbal & body-oriented approach. In the authors' meta-analysis of 41 intervention studies and eight randomized controlled studies, six common outcomes were identified in the research of dance and DMT interventions: "(a) quality of life, (b) clinical outcomes, (c) interpersonal skills, (d) cognitive skills, (e) (psycho-)motor skills, and (f) residuals (psychotic symptoms and physiological change)" (Koch et al., 2019, para. 15). They found that DMT had strong effectiveness in clinical outcomes, quality of life, and cognitive skills. Dance

interventions were most effective in (psycho-)motor skills, clinical outcomes, and cognitive skills.

Koch et al. (2019) explored the qualities that connect dance and DMT interventions, finding the practice of mindfulness to be a substantial link. DMT uses mindfulness in numerous ways, for example, body-scans to build the client's awareness of their body. They did not cite any outward displays of mindfulness in dance interventions, but they recognized elements in the process. A central principle of mindfulness is to bring consciousness to the present moment. The presence of mind is found in dance classes as students concentrate on the intricacies of a particular movement. The body and mind connection can also be found in the act of letting go of all thoughts and being present in the moment to experience the movement sensations.

Due to the current Covid-19 pandemic there has been increasing support for the use of mindfulness in classroom settings with numerous studies supporting positive outcomes such as improved focus (Moreno-Gómez, 2020), decreased negative mental health symptoms (Malboeuf-Hurtubise, 2021), and resilience (Volanen, 2020). Koch et al.'s (2019) research supported the idea of dance interventions and DMT as effective intervention tools by way of mindfulness. This analysis is particularly promising regarding each modality's potential inclusion in school life due to the outcomes of DMT and dance intervention's ability to cover a wide array of issues that may be present in school settings.

Laban Movement Analysis (LMA) is utilized in a variety of fields, including dance and DMT, to recognize and evaluate human movements. The four primary components of movement in LMA are Body, Space, Effort, and Shape. Quantitative and qualitative data can be gathered via LMA, making it an ideal system for experimental research (Ajili et al., 2017; Pereira & Marques-Pinto, 2017; Ramezanpanah et al., 2020).

The LMA system has become so ubiquitous with movement analysis, it is being used to create technology that allows for human computer interactions (HCI); (Ramezanpanah et al., 2020; Ajili et al., 2017). Data collected includes cataloging human gestures with a high level of recognition accuracy via LMA's Body, Space, and Shape categories (Ramezanpanah et al., 2020). Effort is considered to make sense of the emotional element in human movement.

Pereira and Marques-Pinto (2017) included elements of Laban in their research to examine the effectiveness of after-school dance programs in Portugal on students' subjective well-being by administering self-report measures monitoring their self-awareness, social awareness, self-management, relationship skills, responsible decision-making, and emotional, psychological, and social well-being. This study was specifically targeted at improving children's success in school via their emotional, behavioral, and cognitive engagement. A dance program, *Experiencing Emotions,* and another unspecified after-school activity were offered for 12 weeks to middle school aged children. This formed an experimental and control group respectively, to measure the effectiveness of the dance program. The authors hypothesized improved self-reported scores in each area of study would occur in the experimental group; however, the only positive changes were found in their self-management and relationship skills assessment.

Many variables that may have affected the results; of particular interest are the students included in the sample and the leader of these activities. The dance program *Experiencing Emotions* was administered by a psychologist with experience facilitating educational dance programs. The activities included in the dance program included mirroring exercises, improvisations, and teamwork games with balloons, all of which are common in DMT sessions. These activities were selected from the *Experiencing Emotions* curriculum by the psychologist

facilitating the sessions. Screening for prior diagnosis was not performed on the participants, indicating that students may or may not have been in need of a psychologist's services. It is not clear if different dance activities were available to choose from in the curriculum, but the students were essentially participating in a close approximation of DMT sessions. Given the results, there is a strong argument for the utilization of more dance technique-based interventions in future studies for students who do not have diagnosed conditions.

Included in Pereira & Marques-Pinto's (2017) research is an acknowledgement of the similarities and differences between DMT and dance applications. The origins of children's creative dance and DMT were both developed from Laban principles to promote physical and emotional development. The authors differentiated between the two in terms of outcomes; Creative Dance may have therapeutic effects, but teachers are not actively working to engage with this area while DMT is purely focused on therapeutic needs. This brings into question the need for primary and secondary goals. If a student is experiencing therapeutic gains, known to them or not, does it really matter if it is labeled as therapy? Pereira & Marques-Pinto's (2017) answer to this query was stage of treatment; Creative Dance is targeted at prevention, whereas DMT addresses present difficulties. It should be noted that this same article included studies that found DMT capable of providing preventative care. There appears to be merit in dance interventions and DMT at providing very similar benefits in school settings.

Evidence of a mirror neuron system was first detected in macaque monkeys by having them observe and perform the same actions while being hooked to a brain scanner (di Pellegrino et al., 1992). From this study, it was hypothesized that a similar neuron system existed in the human brain. Since then numerous studies have given credence to the existence of a human

mirror neuron system (Calvo-Merino et al., 2005; Cross et al., 2006; Ivaldi et al., 2021; McGarry & Russo, 2011; Orgs et al., 2008).

Calvo-Merino et al. (2005) studied the brain functions of professional ballet and capoeira dancers while observing skills from each technique. They predicted that greater motor activation would occur in fMRI scans of the dancers observing their own style (i.e., ballet dancers observing ballet and capoeira dancers observing capoeira). In addition to the professionals, a third group with no motor expertise in ballet or capoeira were shown the same clips of dance actions with the assumption that they would not show a preference for either dance technique. The criteria for movement selection was set by a dance choreographer who was tasked with finding similar motions from each technique in regards to the direction, speed, body part recruitment, and body location.

Their results found strong responses in the observer's premotor, parietal cortices, and the superior temporal sulcus (STS) when viewing movement in the area of their expertise (Calvo-Merino et al., 2005). The premotor, parietal cortices, and STS areas of the brain are associated with motor activity. This suggests that mirror neurons are activated more when observing movements that the observer has acquired.

A similar experiment conducted by Orgs et al. (2008) obtained comparable results. They used electrophysiological measures on two groups of college students in Germany, one of dancers and one of non-dancers. Specifically, they studied the alpha and beta brainwave frequencies in relation to event-related desynchronization (ERD) to determine the effects of movement expertise on observation of familiar movement. ERD refers to the process of visual intake, extraction, procession, and attention in the brain (Pfurtscheller et al., 1994). Desynchronization effects were predominantly seen in dancers observing dance movements, not

in the non-dancers' observations of the same movements. Their findings strengthen the connection between observation of learned actions and activation of the mirror neuron (Orgs et al., 2008).

Calvo-Merino et al. (2005) and Orgs et al. (2008) did not study the recruitment of emotion-based areas of the mirror neuron system, thus making it difficult to establish the role of emotion in observing movement that has been mastered. However, it is likely emotions are linked to some degree in the probable mirror neuron system. By combining elements of DMT with dance interventions in future studies, both motor skill and emotion can be addressed.

Cross et al. (2006) utilized fMRI scanners on a group of expert dancers to learn to what extent the brain is activated when observing actions that one is in the process of learning. The researchers hypothesized that anterior rostral SMA (SMAc), the ventral premotor cortex (PMv), the inferior parietal lobule (IPL), the superior temporal sulcus (STS), and M1 areas of the brain would increase in activity when the dancers observed movements they were in the process of learning. Undergraduate and graduate dance students, 10 in total, from the Dartmouth Dance Ensemble participated in the study. Over the course of six weeks, the participants rehearsed choreography from the dance, *Skylight* (Dean, 1982 as cited in Cross et al., 2006). At the end of each week, fMRI scanners were used to observe the brain activity of each participant as they viewed the material they learned, the material they would soon learn, and movements they were not going to learn. As they viewed the material, the dancers rated their ability to perform each sequence. Five of the six weeks were used as the data presented in the study.

Results from this study (Cross et al., 2006) found that as the students learned more of the material, the rating of their ability to perform each sequence increased, with no change to their ratings of movements they were not familiar with. Brain activation increased when viewing the

sequences, the participants felt they were capable of performing. All five areas hypothesized to activate during the study were stimulated, particularly the areas of STS, PMv, IPS, and SMr during movements the dancers had rehearsed. They concluded that there is indeed a link between physical embodiment and action simulation.

This study's sample size is very small, making it impossible to generalize to the population. However, these findings show promising results that support the embodiment exercises of DMT and dance classes. As a person practices, they become more confident in the movement and can recognize it in others. These tools are already utilized by humans in the simple act of growing up. The same tools can be employed long after our physical maturing stages end in the form of socioemotional learning.

McGarry and Russo (2011) investigated the potential body mechanisms recruited to create empathy that is formed between practitioner and client via mirroring. They define mirroring as "occurring when two people make similar body movements that are coordinated or slightly echoed in time" (McGarry & Russo, 2011, p. 178). This has been a core practice of DMT since the inception of the form, yet there was no empirical evidence supporting the technique's use. Research has only recently started to emerge on the validity of mirroring via the study of the mirror neuron system. Based on the research, this neural circuitry activates when a person performs an action and when a person observes someone performing an action. Carr et al. (2003) put forth a hypothesis that while seeing a person's actions and emotions, we need to recreate our own version of this same action in our brains to attain the emotion of the other. It is presumed that this process involves the mirror neuron system and is the area of our brain where empathy is formed.

This growing research field links the mirror neuron system to the understanding of intention in another's actions and emotions. By simply observing a person's movements, we can understand the intention. Studies show that by practicing mirroring, we can have a "greater empathic response" (McGarry & Russo, 2011, p. 179). Therefore, when a therapist is mirroring a client, the client can recognize their emotional state being mirrored back to them, cueing their mirror neuron system to fire off feelings of understanding.

Mirroring is a common practice for DMTs. As students, DMTs study movement patterns, training to embody their client's intention in exaggerated or subtle ways. Dance teachers are also well versed in identifying the movement qualities of their students, but the intention of the mimicry differs from that of a DMT. Often mirroring or mimicry is used to find fault and then to correct the movement

Ivaldi et al.'s (2021) systematic review of conversation analytics in music and dance classroom settings found that, at the college level, teachers' communication style was not used as a way of understanding the student. Rather they found examples of "teachers continually interrupting, talking over or stopping students' playing, touching students to adjust posture, or mocking students' playing and exaggerating incorrect performance" (Ivaldi et al., 2021, p. 13). These interactions were largely teacher led, with little if any opportunity for students to lead. In fact, students were expected to interrupt the teacher if they wanted to speak up for themselves. A common teaching tool was the use of exaggeration and mocking of the incorrect way of doing things (i.e., mirroring) and then the correct way of performing. Given our current understanding of mirror neurons and the role they play in emotional understanding, this could be detrimental to the student's psychological state. Research into mirroring is still in the early phases, but it would

be worth examining the role mocking plays in mirroring to show an undesirable quality and how that affects the student/teacher or student/practitioner relationship.

DMTs are also versed in shifting the actions and/or movements of a client. For example, if a client is expressing negative emotions and finds difficulty breaking out of them, a DMT can take on the client's body posture to further investigate their intentions. They then can actively try to change their client's breath and/or body position to bring them into a regulated place. The therapist uses this process in a respectful manner. The DMT does not tell their client how to feel, they simply shift from unregulated to regulated. It is only at a high level of dance practice, specifically in the case of ballet and modern dance, that teachers and choreographers ask the performers to establish the intention behind their movement. It is taken for granted that only once a dancer is deemed professional, they are then granted permission to involve their experience. However, there is no reason to assume that young student dancers cannot use their emotional experiences while in dance class. Based on this research it is reasonable to assume that mirroring techniques should be considered when used in dance interventions to create greater trust and understanding between the teacher and students.

Neurohormone Testing

A study by Jeong et al. (2005) found on the effects of DMT on mild depression in female adolescents in South Korea, concluded with promising results. The study selected 40 volunteers from a school in Iksan, South Korea, 20 of which were assigned randomly to the DMT group and 20 to the control group, who received no treatment. Each volunteer completed a self-report questionnaire, the Symptom Check List-90-Revision (SCL-90-R), which includes sections on "somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility,

phobic anxiety, paranoid ideation, and psychoticism" (Jeong et al., 2005, p. 1714) and submitted to plasma serotonin and dopamine concentration testing as pre- and post-test measures.

Participants received 45-minute sessions, three times a week, for twelve weeks. At the end of the study, Jeong et al. (2005) found significant improvement in all areas of self-reported symptoms found in the SCL-90-R as well as an increase in concentration in plasma serotonin and dopamine measurements for the DMT group, with no change or decreased levels in the control group. They hypothesized these results were due to the increase in "muscle relaxation and the changes in stress hormones" (Jeong et al., 2005, p. 1717). While the authors point out the many limitations in this preliminary study, including small sample size, lack of a third study group, and lack of a long term follow up, they conclude that DMT may be a "simple, inexpensive, and practical therapy" (Jeong et al., 2005, p. 1719) for female adolescents experiencing mild depression.

Once again, this study is limited in its sample size, making it hard to generalize to the greater population. While this author personally agrees with the conclusions of Jeong et al. (2005), they do not address what about DMT makes the treatment "simple, inexpensive, and practical" (p. 1719). Future research should include the costs of DMT interventions with the students to compare with traditional therapy costs. However, these results are promising and add further support for the inclusion of DMT in a school setting.

West et al. (2004) conducted a study that measured various activity levels by collecting data on perceived stress and cortisol levels on students participating in a Hatha Yoga or African dance class. As stress is becoming an increasing concern in the United States, particularly among students, and interest in alternative forms of medicine to deal with this stress is in demand.

There are many studies that speak to the effectiveness of yoga on decreasing stress, but relatively few on dance (West et al., 2004). Healthy college students were recruited for the study, 21 of which were in the African dance class, 18 in Hatha Yoga, and 30 were in a biology lecture as a control group for a total of 69 participants. Students were asked to fill out the Perceived Stress Scale (PSS) and the Positive Affect and Negative Affect Schedule (PANAS) before and after each class. Additionally, all students provided salivary samples prior to and after their lessons.

The results showed decreased levels of perceived stress and negative affect from the students in Hatha yoga and African dance, with no change occurring in the control group (West et al., 2004). Cortisol levels were found to drop in Hatha Yoga and rise in African dance, again with no change in the biology class. This outcome is significant as the participants' perceived stress showed no difference between the two study groups. West et al. (2004) hypothesized that this may be due to “the amount of physiological arousal produced by the [African dance] intervention” (p. 114) with African dance requiring a high level of activity and Hatha yoga focusing on muscle relaxation.

Other factors that may influenced these results may come from the design of the study, as participants were not randomly assigned. They were recruited from students already enrolled in these previously established college courses (West et al., 2004). This could indicate that students prefer their chosen class as a way to destress and does not reflect the greater population. This study only looked at a single class and did not produce any data on the long-term effects of each intervention. While this study is larger than many in this review, overall, it is still much smaller than necessary to be generalizable to the population.

Even with the limitations of their study, West et al.'s (2004) findings are an example of the variety of movement styles available to dance classes and DMT in schools. While most of the literature identified a form of creative dance as their primary mode of instruction, there are a plethora of technique options available. Even very high-energy styles, like various African techniques, can be combined with the principles of DMT and could be of value to a student's physical and emotional health during the school day.

TANZPRO-Biodanza is a movement-based program implemented in multiple countries around the world that appears to already be combining the more rigorous physicality of dance and the therapeutic properties of DMT. A study by Stueck et al. (2016) studied the changes in cortisol levels that occurred from a TANZPRO-Biodanza intervention on a group of Kindergarten students in Germany. Originally developed in the 1960s by Rolando Toro, Biodanza utilizes "music, movement, and human contact" (Stueck et al., 2016, p. 75) to promote the expression of emotion and body language with empathy through self-regulation. All TANZPRO-Biodanza courses, including this study, consist of 45-minute to one hour-long weekly sessions for 10 weeks. Ten female kindergarteners were chosen to participate in the TANZPRO-Biodanza from Mockrehna, Germany. Cortisol saliva tests were administered pre- and post-session on weeks 1, 3, 5, 7, and 9. Additional tests on the student's concentration and emotion recognition abilities were also administered one week prior and one week after the TANZPRO-Biodanza course.

Cortisol levels dropped after each session as compared to their pre-test levels for all children categorized as having medium-high levels, but not for the students considered to have low pre-test cortisol levels (Stueck et al., 2016); those students were found to have no changes. They also found similar trends in the concentration and emotion recognition tests; students with

medium-high cortisol levels made fewer mistakes and did so twice as fast in each measure from pre- to post-tests with the students having low cortisol levels consistently showed no change in performance. Though they acknowledge the vast limitations of the study, the authors concluded that dance, specifically TANZPRO-Biodanza may have positive effects on kindergarten-aged children's cortisol levels, cognitive skills, and emotion recognition.

This study continues the trend of tiny sample sizes, making generalization impossible. The trend of minuscule study populations keeps DMT and dance classified as a niche and exclusive treatment option. With no control group or long-term effects included, Stueck et al. (2016) are not able to determine with confidence the cause of the positive changes they observed in the participants. Despite these shortcomings, the implementation of a program like TANZPRO-Biodanza is promising if for no other reason than it is dance and DMT blended together and being administered in schools. The program was developed for the allowance of multiple members of school staff to be able to teach the course, including schoolteachers, dance teachers, psychologists, and psychotherapists. This would be a potent and essential mental health option to bring to schools because of the short course duration and ability to give training to members of staff to continue holding the program in future years.

Discussion

Currently, there is little crossover between dance interventions and DMT modalities. However, as both are underutilized and underfunded, it's reasonable to suggest that combining the two is a possibility in the future.

Dance as healing has been a concept around for the length of human existence, but the post medieval western world severed the art from the healing. In the early 20th century dance teachers began to rediscover the capacity dance holds for healing and eventually birthed the field

of DMT. DMT has strived to be taken seriously as a credible therapeutic field and in the process has distanced itself from traditional dance practices that hold great healing power, such as social occasions and classroom settings. Once again, this severed the connection dance inherently holds to healing.

Studies show the benefits of both dance interventions and DMT in students of all ages via salivary samples of cortisol, dopamine and serotonin (Jeong et al., 2005; Stueck et al., 2016; West et al., 2004), stress and depression scales (Georgios et al., 2018; Jeong et al., 2005; Moula et al., 2020; Olive et al., 2019; Pereira & Marques-Pinto, 2017; West et al., 2004; Wiedenhofer & Koch, 2017), and HRQoL (Georgios et al., 2018; Moula et al., 2020). Programs such as TANZPRO-Biodanza (Stueck et al., 2016) are already undertaking the project of unifying dance and DMT interventions.

School budgets are not large, and very little money is put into mental health services for the students and staff. However, it does appear that there is a shift in the cultural conscience surrounding students' mental health. There is a long way to go before we are able to adequately meet every child's needs. An easy way of doing this is by allowing a combination of services such as dance programs and mental health elements such as DMT. These promote physical exercise, creativity, and emotional support. Studies supporting this kind of program remain preliminary. There are small intervention groups and little long term effect data is available to back up this claim.

To find what does and does not work for each population, more research is needed. This literature review began by investigating the similarities and differences in dance interventions and DMT. This author believes the benefits of creating distinction between DMT and dance is only necessary as to determine how to best incorporate the two.

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