Spring 5-19-2018

Mirroring, Social Learning and Dance Movement Therapy with Childhood Autism Spectrum Disorder: A Literature Review

Megan Fitzpatrick
megangracefitz@gmail.com

Mirroring, Social Learning and Dance Movement Therapy with Childhood Autism Spectrum Disorder: A Literature Review

Capstone Thesis

Lesley University

April 23, 2018

Megan Fitzpatrick

Dance Movement Therapy

Dr. Rebecca Zarate

Abstract

The literature review investigated the use of mirroring to help develop emotional understanding through social learning with children diagnosed with Autism Spectrum Disorder (ASD). The research reviewed was used to further cognize how mirroring could give a child with ASD a better understanding of their own and others' emotions through social learning. The findings revealed that mirroring could be an affective tool to build social awareness of emotions in children diagnosed with ASD. The mirror neuron system (MNS) is the area of the brain that assesses perception and production of movement creating an overlap. Using the idea of the mirror neuron system, mirroring was a tool created to enhance emotional understanding, which findings revealed to be beneficial for the emotional inconsistencies seen in Autism Spectrum Disorder. Expressive therapies (ET) have implemented affective treatment techniques for children diagnosed with ASD who are in need of social learning skills. They build these social learning skills by mirroring a child's intention and modeling emotions. Mirroring is a strong focus of dance movement therapists. DMT's noticed that a child's movements could connect to their emotions, which are learned throughout development. Future application of this research will benefit the field of Dance Movement Therapy as well as benefit individuals diagnosed with Autism Spectrum Disorder.

Autism Spectrum Disorder, Mirroring and Empathy: A Literature Review

Introduction

According to the Centre for Disease Control and Prevention (CDC) it is estimated that one in sixty-eight children are diagnosed with Autism Spectrum Disorder (ASD) in the United States (CDC 2010). ASD has been identified as a developmental disorder that originates in prenatal brain development and continues to develop differently throughout an individual's life. (Vivanti & Rogers, 2014, p. 2). In addition, ASD is the most common neurodevelopmental disability discovered in childhood. Much of the current literature on children diagnosed with ASD focuses on this population's emotional and cognitive weaknesses. The hope for this research is to determine if social learning created by mirroring can help children with ASD develop better emotional understanding.

The interventions that have been prioritized to research ASD have lacked in significant findings showing relevance for helping this populations specific social needs (Alter-Muri, 2017, p. 3). There is a unique set of symptoms of autism spectrum disorder in children, which include atypical behaviors for normal development such as repetitive movements and thinking processes, odd body posture, and uncommon movements such as rocking and hand flapping. Many of these atypical symptoms involve the child's use of movement and their inability to interact to others through movement. These symptoms lead to an overall impairment in social interactions. For centuries movement has been a leading form of communication, which has allowed infants to explore their space and their bodies in order to relate to others (Stern, 1985, p. 74). Dance movement therapy (DMT) is a field that can address these two components of movement and social communication. Imitation of movement is something that develops and continues to develop as you grow up, which lays the foundation for social connectedness and emotional

sharing (Rogers et al., 2003; Stern, 1985; Trevarthen, Kokkinaki, & Fiamenghi, 1999). By utilizing dance movement therapy, ASD could become less of a social disability.

Autism Spectrum Disorder (ASD) is a neurodevelopmental syndrome that is defined by deficits in social reciprocity and communication, and by unusual restricted, repetitive behaviors (American Psychiatric Association 2000). The name ASD is used to describe the variability in presentation depending on severity and symptoms. ASD is mainly diagnosed at a young age and can become present up until the age of three. Some children can be diagnosed as early as the age of 2, but most children diagnosed with Autism are not diagnosed until after 4 years old. The first sign of this disorder can become apparent when children show a lack of communication even though they can recite memorized information like the alphabet. These symptoms must affect an individuals everyday functioning to be considered ASD. Issues that arise for children with ASD include an inability to make eye contact with others or maintain a conversation, which affects their relationships. These children will remain isolated, and they may have flat affect, which could be perceived as them lacking the ability to be empathetic. This disorder is a chronic disability without any current possibility for a cure.

Martin (2014) understood that ASD is a "spectrum" (p. 4). Martin (2014) states that, "because the nature and severity of autism symptoms vary from individual to individual, the disorder is now considered to be a spectrum on which the severity of symptoms are categorized onto three levels" (p. 6). This study was developed to examine how DMT can be utilized across the spectrum to address the early developmental connections between social and communication challenges in children with ASD. Potential clinical considerations for practice and theoretical frameworks are discussed as necessary areas to integrate DMT during early development of children with ASD.

Current treatment and diagnostic approaches for children with ASD do not involve DMT in the assembly of the clinical team. Faras, Al Ateeqi, and Tidmarsh (2010) discussed current treatments for ASD. The current treatment that is being used for this disorder is developing language, social responsiveness, imitation skills and appropriate behaviors. Social deficits are symptoms that begin to show as a child becomes more mobile, and as he or she becomes more socially aware of things such as school and play dates. The three major domains of symptoms created for children with ASD are communication, interaction and imagination. Typical approaches include the treatment team model, which includes professionals from occupational therapy, psychologists, behavioral based therapists and speech and language therapy (Bengt and Bengt, 2004, p. 3). A diagnosis of ASD is based on autism-specific history and clinical observation. When diagnosing a child with autism it is important to notice if there is nonverbal communication behaviors during their social interaction either verbal and nonverbal (Diagnostic and Statistical Manual, 2013, p. 50). The situation can either occur at home, school or play dates, but is always presents as unfamiliar social behaviors and patterns of development. Fabbri-Destro, Cattaneo, Boria and Rizzolatti (2013) noted that motor functioning in Autism is part of the etiology of the diagnoses rather than just a symptom. The etiology makes age-appropriate social functioning difficult for children with ASD.

The developmental milestones that make up a person's etiology include the gross motor skills, fine motor skills, language skills, cognitive skills and social skills. These milestones are all included in the possible deficits that can occur with an ASD diagnosis. The gross motor skills for a typical developing child would include the transitioning from rolling over to sitting, as well as emerging to standing and walking. Fine motor skills would include the child being able to dress themselves, playing with other kids, and writing. Language skills include the ability to

understand what are people are saying, cognitive skills refer to remembering and reasoning, and lastly the social skills include responding appropriately to others. Social attunement is another large part of the autism diagnosis, which plays into the child's ability to build on these developmental milestones. The child's ability to socially attune can be changed by finding the behaviors that are attributed to poor developmental skills. Clients who show normal development will have a more affective ability to spontaneously attune in their interactions with others. Children diagnosed with ASD miss or have a delay in one of these critical milestones. Research discusses how the theoretical framework needed to integrate DMT interventions during early development. Due to research connecting mirror neurons and movement, the dance movement therapy intervention of mirroring will be explored. Mirroring brings the connection of the mind and the body connection together in therapy. The thought to bring mirroring as a tool for the treatment of autism is based on the idea that individuals with autism have an altered nervous system relating to their mirror neuron system.

Faras, Ateeqi, and Tidmarsh, discussed current treatment for ASD. Current treatment that is being used for this disorder is developing language, social responsiveness, imitation skills and appropriate behaviors. DMT can further the current treatment on the symptoms experienced in both ASD verbal and non-verbal communication deficits. Due to the specific elements associated with ASD, individuals diagnosed with this disorder benefit from the use of movement and using their bodies to inform their understanding of social learning (Tortora, 2006, p. 12). Dance as an art form focuses on expression using the body; dance movement therapy (DMT) shares the same values. DMT is defined by the American Dance Therapy Association (ADTA) 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 (American Dance Movement Therapy Association, 2017).

Individuals learn through seeing and doing, learning patterns and other critical parts of how to function through traumatic experiences and relationships. These ideas of learning by patterns/rhythm, and by doing related to the research model created by Martin (2014). When individuals learn movement patterns it becomes an individual's response to his or her inner emotional state. This generally means that when an individual sees others communicate socially, their mind connects to the neurons related to the proper response needed for this experience emotionally. Therefore, the rationale is that if movement patterns can be changed, dance movement therapists can promote health and growth in children with autism by teaching new movements. Such changes in movement patterns "create a sense of wholeness by experiencing the fundamental unity of body, mind and spirit" (Levy, 1988, p. 15). Hebbian Learning supports the scientific component to the connection between the mind and the body due to its relationship to the mirror neuron system and emotional understanding (Baron-Cohen, Leslie and Frith, 1985, p. 9).

Movement allows for the verification of the unconscious process in a symbolic way to create relationships as well as a frame for building body image and personality development (Levy, 1988 p. 28). Symbolic interaction becomes a vital part of therapeutic work that is in dance movement therapy. Both the therapist and the client can find a deeper meaning into what can be seen through symbolic expression. Some examples of symbolic movement include personal touch, eye contact between two individuals as well as group eye contact, facial expressions including smiling and frowning and body movements (Ellis, 2001, p. 3). These symbols can have multiple meanings depending on the individual. Dance, for a long time, has been used as a

cathartic and ‘therapeutic’ tool for centuries (Levy, 1988, p. 1). The combination of dance and movement in DMT allows for children diagnosed with ASD to develop skills while remaining either verbal or nonverbal depending on their comfort level (Baron-Cohen, Leslie & Frith, 1985, p. 8). DMT gives a way for these children to express themselves and communicate. Movement can be used to take away a persons need to articulate their emotions and feelings verbally due to their nonverbal nature. If an individual does not know where their emotions are coming from the therapeutic process can be confusing. The hope for this literature review is to show how dance movement therapy can be assets in treatment to make children with autism have a less confusing therapeutic process.

The field of psychology and specifically DMT connects ASD symptoms and behaviors such as children showing a lack of emotional understanding to impairment in their developmental milestones. If the connection between children is lacking, certain methods and techniques are required to address this particular area of functioning. One theory that may be helpful to think about while researching this topic is Hebbian learning (Gallese, Rochat & Berchio, 2012, p. 18). Hebbian learning explains that movement is viewed in relationship with emotional expression and mirror neurons. Hebbian learning scientifically explains that this is creating a connection with two neurons in the brain and strengthens the neurons on either side of the brain’s input and output. Approaching treatment for ASD with this perspective may be beneficial in supporting healthier growth of developmental milestones for individuals with ASD. Hebbian learning is the guiding assumption to this research on DMT, ASD and mirroring because of its potential to be a useful tool to create the fundamental unity of body, mind and spirit. Hebbian learning also supports the idea of building social learning skills for ASD.

Hebbian learning can help produce a better understanding of how the mind works to inform theory of the mind as it applies to clinical practice. Another theory that stands out is called the Theory of Mind (ToM) (Baron-Cohen, Leslie & Frith, 1985, p. 9). It is the idea that beliefs, desires and intentions are things that are used to understand how someone is acting and how to respond to these actions. ToM helps individuals navigate through emotional situations. It is between the ages of four and five years old that children start to think about others' feelings and emotions, which is why this is when it is the most important to begin developing ToM when individuals with ASD are young. It is also important to notice emotions at this age because this is when the diagnoses of ASD are usually determined. Taking the concept of Hebbian, and learning through movement and emotional development related to the ToM, dance movement therapists could help to aid in a child's development. DMT techniques can potentially be beneficial to develop awareness not only in the neurons, but also body awareness to build social learning even if the client is nonverbal. Hebbian learning is informing researchers whom also understand ToM, and showcasing how both of these theories support the benefits of creating treatment using the MNS.

Research on the mirror neuron system (MNS) suggests that the brain areas involved in perception and production of movement overlap, and that these areas are also involved in the understanding of movement intention (Rizzolatti & Craighero, 2004). Studies that were reviewed discussed the importance of the ToM connection to mirror neurons. Due to Autistic individuals lacking some mirror neurons they struggle with the ToM. ToM brings together ASD's negative symptom of inability to understand emotions and social functioning together, creating the connection of the mind and the body. ToM explained by Rizzolatti and Craighero (2004) as a tool to predict and respond to other's behaviors by putting aside one's own perspective.

There is a need to connect these components of MNS and DMT together as a way to consider a new, multifaceted approach to working with children with ASD. While there is little current evidence to support the idea, Martin (2014), did reveal that DMT could aid in the development of social and communication skills to help individuals with ASD. The author investigates the importance of usual development and how that differs from a child who is experiencing autism spectrum disorder. Martin explores the idea that DMT could help the development of social and communication skills in children with ASD. The articles intention is that DMT can improve motor deficits that many other forms of therapy do not have the ability to change. In order to bring all these theories together, the authors discuss the use of attunement and mirroring. These authors understand that in order for autistic clients in treatment to truly develop skills they must be able to attune to emotions. In order to attune to their emotions they need to be given unique and innovative ways that connect their mind and body.

Expressive Therapies and ASD

Many areas of the expressive therapies (ET) have implemented affective treatment techniques for children diagnosed with ASD who are in need of social learning skills (Fabbri-Destro et al, 2009, p. 6). This includes expressive art therapy, music therapy and drama therapy. Art therapy has been known to improve a few areas of ASD symptoms including motor skills and emotional issues. Haque and Haque (2015) discuss that art therapy can help with hand eye coordination by using repetitive behaviors such as weaving and printmaking (p. 2). These art forms help motor skills by channeling the individual's attention to one activity without overstimulation. Art therapy also uses the act of mirroring in a different way (Epp, 2008, p. 4). These therapists will include mirroring of the autistic individuals in an attempt to help reduce stress, anxiety and frustration. Art therapy has also been used to help autistic children

communicate, narrate and describe their memories. In addition, there are some ways art therapy has been used to improve social skills by creating collaborative group projects.

Another field with research in the development of children with autism spectrum disorder is music therapy. Kern and Davis (2013) reported that the top area of research for children diagnosed with ASD was communication skills, social skills and emotional skill and joint attention. Furthermore, within the body of literature, there is a clear trajectory of music therapy being specifically helpful with social skills building. Authors in music therapy discuss how the clinical concept of meeting client's specific needs by utilizing clinical applications such as turn taking, choice making and appropriate body contact with others in the music (Wigram and Gold, 2006, p. 5). Music therapy can utilize beats of music to help children with ASD have cues to know when their turn is occurring which in turn develops communication skills. Beat making also helps with eye contact between peers and responsive communication (Wigram and Gold, 2006, p. 5).

Music Therapy and Joint Attention

Joint attention was another skill that was addressed by music therapists Kim, Wigram and Gold (2008). Joint attention is defined by eliciting social skills for communication that includes pointing and gazing. Kim, Wigram and Gold (2008) stated that "Acquisition of joint attention skills plays an important role in early development, as without joint attention skills, higher functions such as communication, social interaction and language cannot develop well"(p. 3). Music Therapists included this during sessions by introducing improvisation led by clients, which followed with the therapist creating improvisations to work on modeling and turn taking. The music therapists would watch the client's joint movement during improvisational music. This study by Kim, Wigram and Gold (2008) utilized their understanding of response

evoking techniques involved in creating meaningful and enjoyable musical themes to work with the children's expression and focus their attention (p. 2). The response evoking techniques were what were used to draw children's attention toward musical joint engagement. These techniques of joint attention show a significant affect on the children with ASD's eye contact and turn taking duration.

Drama Therapy and Written Scripts

Drama therapy has also been utilized to work with children diagnosed with ASD. Drama therapy has been known to help this population develop social skills by creating empathy, self-regulation, making friends and conflict management. One of the most popular techniques utilized by drama therapists was using written script's that teaches theory of mind (D'Amico, Lalonde and Snow, 2015, p. 4). Drama therapists have the ability to give characters or parts to children with ASD to get there create abilities flowing. Using drama therapy with children with ASD creates an ability to role-play what it would be like to be more social and be able to communicate their needs to others. Though all areas of expressive therapies address important parts of an ASD diagnosis, dance movement therapy uniquely utilizes movement and mirroring to improve social and emotional functioning. This allows the aspect of emotional understanding to be perceived in a fun and interactive way. Many of these other forms of expressive therapy are utilizing some forms of movement to build the clients ability to socially learn.

Dance Movement Therapy and ASD

DMT is built on the idea that "human reception, processing and response inextricably link the mind and body into a functional whole" (Fitt, 1988, p. 278). Due to the fact that dance and movement are nonverbal, it gives children with communication issues a means to relate to others. Dance movement therapists have a unique way to assess children with ASD even if the

child is nonverbal. One example of this is the Body Movement Scale, which was created by dance movement therapists to tailor an individual program to suit children with ASD's developmental needs. It is understood that children with ASD suffer poor understanding of body image and lack of spacial awareness. Scharoun et al. (2014), states that DMT leads to "increased body image through exploration and process oriented learning, enabling children with ASD to expand their movement repertoire" (p. 10). There have been numerous case studies explaining the many uses for DMT when helping individuals with ASD (Levy, 1988, p. 5). DMT leads to an embodied understanding of the physical components of ASD. The main modes of action that DMT takes on are the social difficulties in autism by practicing the bodily aspects of processing to increase parallel processing related to one's own mental state. Overall, this is creating an important developmental connection between the mind and the body.

When using DMT with children with ASD, the dance movement therapist should be able to meet the children in their own personal movement patterns and possibilities to relate. If the client is met where they are at, then the child's abilities will show and they will feel empowered in their own movements. In these therapy sessions, the therapist does not necessarily have to get their client to become verbal but are able to stay in the non-verbal. The therapist takes the movement that the clients give them and do not try to fix these movement patterns, but instead they unlock the potential in what has been shown to them. The therapist in these sessions will take notes on what movement patterns remain constant throughout sessions. The dance movement therapist can use these movement patterns to find a possible analysis behind them. It is reported by Samarriter and Payne (2017) that most studies of children with ASD used mirroring interventions and was proven affective on their sensory-motor regulation as well as on their effectiveness to relate to their environment and others movement patterns (p. 3). Dance

movement therapists working with children with ASD use mirroring to create a flexible and playful environment with their client, which causes developmental improvements in ASD. Mirroring has been reported in these case studies to have a positive effect of the children's sensory-motor regulation. Marian Chace was one of the first dance movement therapists to use mirroring technique for World War II veterans in the 1940's who after the war experience an inability to express themselves. Chace found the ability to not only mirror the exact movements, but also find the qualities in each of the movements. After treatment, the veterans were able to express themselves to others affectively and no longer felt withdrawn. Mirroring creates closeness when the therapist provides the client with an opportunity to feel seen and acknowledged.

Mirroring and ASD

Mirroring is a tool that is used by dance movement therapists to help build rapport with clients and allow for the clients and therapist to enhance their emotional understanding of each other. Mirroring occurs when two people are making similar body movements that are either coordinated in time or at a slight echo. The key areas of mirroring that are beneficial for treating children with ASD are all action based learning skills such as seeing movement displayed, viewing an individuals character and observing someone's response. . Display of movements, resonance, and facial feedback are all ways that a child can learn emotional responses and understand them.

Displayed Movement

Mirroring is imitating the qualities of movement, allowing the client with ASD to understand the movements that are being displayed, and create their version of it. Through this form of treatment, enhanced somatic and emotional understanding occurs between the client and

therapist. According to Koch, Mehl, Sobanski, Sieber, and Fuchs (2015) effective mirroring is on the cognition, emotion and motor function of autistic individuals. Learning through the action of imitation creates an internal representation of movements that can be used as a primary mode of learning. If this can help the relationship between the client and the therapist, it may be beneficial for others as well. Mirror neuron research has noted that viewing another persons emotional response while remaining still has an impact on an individuals understanding of others emotions.

Resonance

Resonance is ideas that dance movement therapists use to improve ASD's understanding of emotions. Resonance in DMT is using motor resonance rather than sound to get the individual to understand the quality being displayed. Resonance taps into the child's MNS, so by using resonance the therapist can enhance the MNS. Resonance can occur on an individual level, autonomic or interpersonal level. Unconscious mirroring falls under the interpersonal level of resonance, which DMT uses.

Facial Feedback

Facial feedback research has shown that although movement is not necessary for individuals to gain a better emotional understanding, mirroring has contributed to greater emotional understanding (McGarry & Russo, 2011, p. 10). McGarry and Russo (2011) state that it has been hypothesized that people perceive emotion conveyed in music by simulating the physical movement that the music is trying to present. It was perceived that overall when musicians and performers are observed; the benefits come to audience members from not just the sounds that are hearing but from the emotional response as well. This proposal suggests that mirroring in a relationship enhances empathy by increasing activation in an individuals mirror neuron system. It also explains the idea that if movement is viewed without verbalization,

emotion can still be understood. This can lead to a stronger action-observation connection in the limbic area of the brain as well as the motor. Developmentally, when children are born they learn gestures, postures and facial expressions by being imprinted on by their parents. Despite the lack of verbal communication between the infant and caregiver they are still able to imprint and understand each other. All of these ideas support the use of mirroring to help support social learning in children with ASD.

Mirror Neuron System

The MNS is defined as the set of brain regions which are active both when witnessing an action and performing an action (Rizzolatti & Craighero, 2004). It is now a popular evidence-based mechanism from neuroscience research that is used to support DMT clinical rationales for use of the technique of mirroring. Object-directed action is also something that can be seen in humans when individuals use motor functioning to complete a task to receive a reward. This could be walking to go to the store or as simple as moving ones fingers to write a paper. Both object-directed action and meaningful actions are stored and created in the MNS.

The study created by Rizzolatti and Craighero (2004) stressed that the important aspect of mirror neurons is the relationship between visual and motor functioning. By allowing children to make connections between their mind and their body they are able to develop a better understanding of emotional communication. Research by Rizzolatti and Craighero (2004) noticed that there is an effective observed and effective response reaction, which relate to the goal of a response and the means for reaching a goal. The researchers Rizzolatti and Craighero found that mirror neurons do not need to observe an action to be triggered once the movement is understood. This study referred to the two states as ‘strictly congruent’ and ‘broadly congruent’. Since the discovery of the MNS, it has been determined that there is a network of areas involved

in it's functioning. These include the pars opercularis of the inferior frontal gyrus (IFG) and its neighboring ventral area, which are activated during the observation, and imitation of an action.

This same article discusses the evidence in favor of the mirror mechanism in action understanding. This research would be in support of the use of mirroring to create better action understanding in ASD. To understand if this idea had validity, two series of experiments were carried out. The first of these two studies were conducted to see if the F5 mirror neuron in the monkey was able to recognize actions from their sound (Kohler et al. 2002), and the second was if mental imagery of an action could trigger activity (Umilta et al. 2001). The study conducted regarding sound and recognition showed that 15% of mirror neurons was responsive to the sound of an action without actually having to see the action being performed. This shows that action and sound can be stored in the brain and brought to focus once the sound is heard even without the action.

The second hypothesis that was proposed by Rizzolatti and Craighero (2004) was if an individual could imagine an action and still be triggered without the physical presence of the original action. The rationale created for this study was that if mirror neurons are involved in action understanding then these same mirror neuron responses should occur in the condition that the individual has sufficient clues to create a mental representation of what is occurring. Overall, both studies showed that there is a response in the mirror neurons that correlates with action understanding. It is stated in this article that, "the visual features of the observed actions are fundamental to trigger mirror neurons only insomuch as they allow the understanding of the observed actions" (Vivanti & Rogers, 2014, p. 5). In other words, in order to better understand actions, it must first be observed and then the mirror neurons can be triggered for the future. The original observed action does not have to always be present in the future for they're to be a

reaction. So for individual's diagnosed with ASD they can learn and retain actions after observing them multiple times by creating connections in their MNS.

Mirror Neuron System (MNS), ASD and Theory of Mind

Research regarding human MNS notes that the goal of an action is fundamental and not just the basic motor features of an action (Hamilton, 2013, p. 3). The MNS is important when being able to perform and understand movement sequencing affectively. It is also believed that the MNS has a connection to the theory of mind (Rizzolatti and Craighero, 2004, p. 8). Originally developed in the 1978 by David Premack and Guy Woodruff, Theory of Mind (ToM) is defined as the idea that beliefs, desires and intentions are things that are used to understand how someone is acting and how to respond to these actions. The ToM allows individuals to also explain and predict corresponding behaviors. The poor social cognition with individuals with autism is sometimes called the broken mirror theory of autism, which directly correlates with these individuals MNS and a lack in ToM.

Due to the fact that this mirror mechanism is broken, children with ASD do not have an automatic flow of shared felt experiences, leading to desires and intentions of others not fully being recognized by individuals with ASD. This can also lead to the feelings of disembodiment and a need to infer based on what is presented to these individuals. Some research was conducted on adults with ASD to test their ability to connect to the ToM. Researchers developed age-appropriate questions that would test social-cognitive deficits in ASD. Another research test was created with stories and scenarios that the examinees are required to explain the meaning of the behaviors involved. These studies did not have the anticipated outcome expected of the researchers, which has lead to the need for future research in understanding ToM in children and adults with ASD. In children, ToM is understood to be responsible for the development of

pretend play. For children with ASD, pretend play may never develop leading to social impotence. ToM creates the brain's ability to have second-order representations that are lacking in autistic children's developmental processing (Baron-Cohen, Leslie, Frith, 1985, p. 3).

A study conducted by Schulte-Ruther, Markowitsch, Fink and Piefke (2007) aimed to specifically identify the neural system responsible to mediating key components of empathy (p. 1363). This study used an fMRI and noticed that emotional facial expressions recruit's brain areas involved in emotional recognition, MNS and ToM. This research shows that there is a connection between an individual ToM, MNS and how someone is able to understand perceived emotions.

DMT, ASD, and Mirroring.

While it is common in DMT training for students to learn how to do movement analysis and use mirroring to match exact movements of a client and reflect the quality of a client's movement based on their mood and temperament (McGarry and Russo, 2011, p. 7). Mirroring with ASD creates a strong connection between the therapists and their client and uses that connection to build and shape a therapeutic relationship that supports development of emotional understanding. Mirroring is a way of training the clients in movement analysis and verbally teaching them what different subtleties of movement represent. Due to mirroring being such a dramatic way of viewing movement, it makes the clients more engaged and is able to view the emotions more clearly. The movements can start out exaggerated and as the children with ASD begin to understand their feelings of empathy then the movements can start to become subtler. By just viewing someone else mirroring oneself has shown to enhance prosocial behavior in autistic children, and to increase one's own propensity to mirror (McGarry & Russo, 2011, p. 181). For children with autism, engaging in mirroring of a client and being able to encourage a

client to mirror emotional movements has been affective in enhancing a clients ability to empathize due to the enhancement in their MNS.

Mirroring also allows for the building of kinesthetic attunement in this population. Kinesthetic attunement is based on the idea that viewing another person's emotions can affect another individual's emotional response as well. One part of the process of kinesthetic attunement is creating empathy. Understanding, acknowledging and interpreting are some of the main factors to the process of creating empathy through movement-based interventions.

Social Learning, ASD, and MNS

Social learning, or otherwise known as 'social mapping' is understood to happen when individuals create connections between different aspects of behavior. In individuals with ASD, this process is thought to occur differently, due to the under development of the mirror neuron system and weak imitation skills. Much of the research regarding the MNS discussed that MNS allows for imitation of actions but actions also directly relate to peoples emotions and empathy. The evidence that the MNS is affected in ASD comes from both behavioral and brain-imaging studies (Schulte-Rüther, Markowitsch, Fink and Piefke, 2007, p. 12). The behavioral studies regarding the Autistic MNS do not state that these individuals can't identify others emotions or imitate behaviors, but it suggests that the accuracy of the imitation and the spontaneity of the response is not always accurate (Vivanti & Rogers, 2014, p. 5). By tracing the movement and expression of others, the MNS seems to be a good approach to create a neurophysiological foundation for affective responses, which include empathy, awareness and morality, which ultimately creates social cognition.

A study by Vivanti and Rogers (2014), discussed the idea of social learning and social understanding in ASD and its relationship with the MNS. In this article, the authors discuss that

there are other models of behavior that help us view ASD and MNS through a different lens. The MNS is very hard to concretely state as the main factor contributing to a disrupted MNS in ASD. This is due to the placement and the inability to isolate this part of the brain. Vivanti and Rogers focus on the mirror neuron system and the development of mirror properties via Hebbian learning. Hebbian learning is the idea that neurons fire in response to action execution and will also fire in response to action observed if execution and observation co-occur systematically.

Social Challenges in ASD

Learning through watching is an important way by which people learn about their environment (MacDonald & Ahern, 2015, p. 1). MacDonald and Ahern (2015) stated that individuals diagnosed with ASD struggling with learning by observing (p. 1). Though individuals with autism can smile and cry, they may not understand when others are presenting these same behaviors. There are a few social deficits behind a diagnosis of ASD. Some of these include, lack of eye contact, difficulty responding to social interactions, inability to turn-take, problems responding appropriately when spoken to. These social deficits can lead to the inability to understand others emotion states, difficulty managing their emotions, and many others. The core of these social difficulties is the problems with emotional contact. Hurt and Ounsted (1966) investigated the use of eye-gaze and noted that individuals diagnosed with ASD looked at people's faces less than the control group.

Research by Wing and Gould (1979) showed that although not all individuals with ASD had social deficits, 70 percent of the autistic subjects fell into this category. Wing and Gould used this information to create three types of social deficits, which were social aloofness, passive interaction and active-but-odd interaction. This study found that social aloofness specifically was marked in younger autistic children under the age of five. Daou, Hady and Poulson (2016) state

that of the numerous functions that emotions serve, the "communicative aspect of emotional expression" is the most important (p. 30). Non-verbal expression is a way of showing emotion that can be either congruent or non-congruent to what an individual is sharing verbally. This can be the most confusing to a client who is struggling to understand emotions shared by others. Deficits in recognizing non-verbal emotions are the most common among people on the spectrum. Social behavior in ASD are chronic though the severity of the symptoms can change based on the level of care the child gets during their developmental stages.

Emotion, ASD and Mirroring

The Oxford dictionary describes the word emotion as a strong feeling deriving from one's circumstances, mood, or relationships with others. In Derntl, Finkelmeyer, Eickhoff, Kellermann, Falkenberg, Schneider, and Habel (2010), emotion is explained as, "multidimensional construct and requires three abilities: first, the recognition of emotions in oneself and other people via facial expressions, shown by the gaze or behavior; second, the sharing of emotional states with others, i.e., the ability to experience similar emotions to other people while being conscious that this is a simulation of the emotional feeling and it is not one's own emotions" (Ashwin, Chapman, Colle, Baron-Cohen, 2006, p. 7). Emotions account for many aspects of our day-to-day life.

Emotion as a social construct which incorporates both cognitive and affective dimensions. It is important to have cognitive empathy and to also understand another person's perspective; to be aware of what they are thinking or feeling. Affective empathy is seeing someone else's emotions and being able to feel these emotions themselves. Empathy is one of the main features assessed by therapists and more specifically DMT interventions that involve the concept of non-verbal mirroring. Recent evidence suggests that the subjects with autism

spectrum disorder show a significant impairment in empathic ability. Individuals with ASD often show an impairment of the perception of other people's mental states such as thoughts, beliefs, and intentions (Frith and Happe, 1994; Frith and Frith, 2003; Jones et al., 2010; Gaigg, 2012; Schwenck et al., 2012). The cognitive dimension of ASD requires cognitive functions including perspective taking and mentalizing. Affective empathy consists of the sharing of another person's internal state. The lack of sharing of negative emotional experiences leads to a failure of appropriate emotional reactions to viewed emotions of others. Ashwin et.al (2006) finds a correlation between the difficulties in negative emotional processing in ASD with the structure of the amygdala.

A study conducted by Mazza et al. (2014) highlighted an analysis of affective and cognitive empathy, which showed significant differences between adolescents with ASD and the control group. There was a difference present both when the participants were used to understand and recognized positive and negative emotions. This study noticed that there were fewer difficulties in the child's empathic concern when the emotion is positive (happy, excited) but the individual with ASD struggled to recognize negative emotions (anger, sadness) in images.

Discussion

The literature review investigated mirroring, social learning and DMT as it relates to ASD. The first sign of this disorder can become apparent when children show a lack of communication even though they can recite memorized information like the alphabet. This aspect of communication is the reasoning for the research regarding social learning and if the technique created by dance movement therapists could be beneficial to ASD. Research supports the benefit of the technique of mirroring to autism spectrum disorder deficit with regards to the social skill of empathy. Children with autism suffer from a lack of successfully developed empathy. Mirroring helps create a child's ability to learn socially emotions such as happy, sad, fear, anger, and many more emotions. The way mirroring builds social learning is through a child's MNS. The literature brought to light that mirroring techniques utilize the MNS to build ToM. ToM directly relates to the MNS due to the ToM's ability to help with children with ASD's social cognition. This researcher's literature review revealed information regarding children with ASD's ability to socially learn, their use of DMT and mirroring.

MNS Findings from the Literature

There was extensive information regarding the mirror neuron system, but much of this research was speculation due to the location of the MNS in the brain and the inaccessibility of this section. The mirror neuron system should be activated when both when an action is being observed and also when an action is being performed. Research regarding a child with autism's mirror neuron system has been extensively researched. For example, the data that was gather by Rizzolatti and Craighero (2004) notes that their research has mostly been conducted on the brain of monkeys. This limits the ability to relate the findings and implications to human subjects with

ASD. It is hard for a researcher to truly know if the information is being processed in the MNS due to the fact that there are many different locations for processing in the brain.

There is limited quantitative data supporting the role of MNS with individuals with ASD there is some qualitative data. Due to the fact that researchers cannot actually see the mirror neuron system in real time it is noted in research that the MNS is responsible to different tasks such as language, empathy, ToM and social cognition. Caspers, Zilles, Laird and Eickhoff (2010), note the mirror neuron system as being widely assumed as playing a key role in action understanding and imitation. These researchers also wanted to explore the idea of the MNS even though this portion of the brain can not be seen in real time. Throughout this research study by Caspers et. al., they discovered that mirroring emotions can help benefit an autistic child's ability to develop throughout adulthood.

Theory of Mind in Literature

The ToM was mentioned throughout this thesis due to evidence that it is part of the development of the MNS. ToM is an individual's ability to interpret someone's intentions and emotions as explained by Baron-Cohen et al. (1985). The ToM for the basis of this research helped create an understanding that individuals with ASD may lack social learning skills needed to develop communally. It is also understood that the ToM is directly related to the MNS. Of the current literature, there are no studies on theory of mind in children diagnosed with ASD, however, there is research related to its affect in adults diagnosed with ASD. The research found that though adults could interpret situations correctly, if a time restraint is placed on them they may not successful understand the situation. It is also by Schulte-Rüther, Markowitsch, Fink and Piefke (2007) that adults with ASD have a better developed ToM. Therefore, this leads me to believe that if placed in the same test of ToM, children diagnosed with ASD would not be able to

correctly interpret situations with or without time restraints (p. 8). To develop a better ToM, we must focus on the MNS. By focusing on the MNS we are creating a struggled empathetic understanding in clients diagnosed with ASD.

Social Learning through Mirroring

Mirroring was a movement-specific technique created by dance movement therapists. The use of mirroring came from the idea of the MNS (McGarry and Russo, 2011, p. 5). According to these studies, mirroring was based on the idea that an individuals mirror neurons recreates what is viewed if functioning properly. If a dance movement therapist can encourage a child to imitate their movements and expression often enough, then the mirror neuron system will have a better chance at developing properly. Much of the research for ASD discusses proper developmental skills. Having a weakened MNS is part of the developmental issues behind the diagnosis of ASD. The literature revealed that working with a dance movement therapist on these developmental delays using mirroring can significantly increase a clients react ability and understanding to empathetic experiences (Tortora, 2006, p. 18). Authors such as Tortora (2006) showed that mirroring is based on the idea that imitation serves such a large purpose in life. More specifically the studies showed ability in individuals to have spontaneous imitation and adapt to different situations or emotions viewed.

A study conducted by Tiffany Field (2017) showed that when an adult interacted with a child by utilizing eye contact, a smile, relaxed body tone and movement the child was able to affect a child with ASD's social and imitative behaviors (p. 90). By just viewing someone else mirroring oneself has shown to enhance prosocial behavior in autistic children, and to increase one's own propensity to mirror (McGarry & Russo, 2011, p. 181). For children with autism, engaging in mirroring of a client and being able to encourage a client to mirror emotional

movements has been affective in enhancing a clients ability to empathize due to the enhancement in their MNS.

Direct versus Indirect Mirroring

The general body of research revealed that the mirroring is most effective when it is direct rather than indirect. Direct mirroring would be what is seen in sessions when being utilized by a DMT. A DMT would work with the child with ASD making direct eye contact and allowing the client to be fully aware of the presence of mirroring in session. The use of mirroring indirectly is less affective due to the lack of understanding of its intention by the participants. These social skills that can be learned include eye contact, facial expressions including smiling and frowning based on their interactions and appropriate body movements.

The process of mirroring is creating strong neurological connections, which is in turn developing a child's theory of mind developmentally. A possible flaw in this idea is the ability to prove that the improvement in a child's empathy is due to the technique of mirroring and not due to developmental factors. Showing children new movements has been proven to stimulate the limbic system in turn creating movement associates with emotions. Mirroring has shown to have beneficial for treatment for this population. Mirroring helps initiate development of the MNS. Once a child is exposed to the mirroring intervention then a therapist can explain to them the purpose of empathy to help the child better understand why this is an important skill to understand. Mirroring also allows for the possibility of non-verbal communication if verbal communication is too difficult. Due to the communication issues that the ASD population has, DMT has proven to be a successful mode of treatment.

Another reason why movement - based interventions, specially mirroring is such a useful technique for this population is due to its ability to create kinesthetic empathy. Mirroring

intervention the goal of finding empathy will not remain constant, but there will be moments that allow for an emotional response. Due to the fact that the MNS is activating during a mirroring intervention, this tool is useful for children diagnosed with ASD.

Needs in Future Research

There are some areas in existing research that could use improvement to create a better understanding of the possible outcomes such as the research conducted by Ashwin, Chapman and Baron-Cohen (2006) regarding recognition of negative emotions by individuals with ASD. There is not a lot of research that supports DMT as a quantitative intervention with children diagnosed with ASD. Most research studies specifically looking at children diagnosed with ASD are qualitative due to the fact that what the study is measuring is empathy, which creates a pattern of the studies understanding of empathy and negative symptoms. The literature revealed a general trend in using small sample sizes, which limited the generalization of findings. The small sample sizes also exposed a large variability in results. This kind of knowledge generation may produce confusing messages as to what DMT is and how it is beneficial for use with this specific population. The hope for future research is to have a more organized research agenda coming from within the ADTA and institutions that can support larger projects and sample sizes to minimize the margin of error. It is possible that some of the studies by Baron-Cohen (2006) and McGarry and Russo (2011) do not show statistic significance due to the small sample size.

Something that was lacking in current research was the amount of information related to the MNS in children with autism specifically. Research conducted on an individual's MNS discusses a broken mirror neuron system existing but not if it exists specifically in children with ASD. Future research should find weather or not a broken mirror neuron system exists in children with ASD. The current research also does not tell what specific issues occur with a

broken mirror neuron system. Due to the fact that the MNS works to understand others emotions research not if the MNS is in fact broken in children with ASD. Further research should also explore the use of DMT with children diagnosed with ASD.

Towards a DMT – Mirror Informed Framework of Practice

Dance movement therapy can be utilized to create connections in the MNS through movement inventions. McGarry and Russo (2011) state, "In DMT, it seems likely that the process of mirroring, which enhances empathy for others, is mediated by an emotional movement feedback system that involves mirror neuron circuitry" (p. 182). The result of these mirroring exercises is an individuals is able to understand others intentions by feeling the intentions or emotions ourselves.

Conclusion

This thesis sought to explore social learning and ASD with children and whether utilizing the DMT technique of mirroring can help create social learning. The literature revealed that as a technique, mirroring creates a better understanding of emotional and empathetic responses in children diagnosed with ASD. Symbolic movements can be part of the social learning experience that is received through mirroring exercises. These social skills that can be learned include eye contact, facial expressions including smiling and frowning based on their interactions and appropriate body movements. All these social learning skills that can be created through mirroring help create the overall understanding that children with ASD can develop a better social understanding. By observing the appropriate body and facial responses expressed by dance movement therapists, individuals with ASD can improve skills they may lack due to issues during development. Though other forms of expressive therapy such as music, art and drama therapy have been used for social learning, mirroring can create a fun and interactive experience

for children in a movement based approach. Dance movement therapy uniquely connects ToM and children's MNS to create a neuroscience base to understand how the technique of mirroring works.

References

American Psychiatric Association (2000). Diagnostic and Statistical Manual of Mental Disorders DSM-IV-TR (Text Revision) (Washington, D.C.: American Psychiatric Association).

Alter-Muri, S.B. (2017). Art Education and Art Therapy Strategies for Autism Spectrum Disorder Students. *Art Education*, 70(5), 20-25.

Ashwin C., Chapman E., Colle L., Baron-Cohen S. (2006). Impaired recognition of negative basic emotions in autism: a test of the amygdala theory. *Soc. Neurosci.* 1 349–363 10.1080/17470910601040772

Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a "theory of mind"?. *Cognition*, *21*(1), 37-46.

Bastiaansen, J. A., Thioux, M., Nanetti, L., van der Gaag, C., Ketelaars, C., Minderaa, R., & Keysers, C. (2011). Age-related increase in inferior frontal gyrus activity and social functioning in autism spectrum disorder. *Biological psychiatry*, *69*(9), 832-838.

Bengt, P., & Bengt, S. (2004). Evidence-based treatment and autism. *Focus on autism research*, 1-48.

Center for Disease Control and Prevention. (2010). Autism spectrum disorders. Retrieved from http://www.cdc.gov/ncbddd/autism/data.html

D'Amico, M., Lalonde, C., & Snow, S. (2015). Evaluating the efficacy of drama therapy in teaching social skills to children with Autism Spectrum Disorders. *Drama Therapy Review*, *1*(1), 21-39.

Derntl, B., Finkelmeyer, A., Eickhoff, S., Kellermann, T., Falkenberg, D. I., Schneider, F., & Habel, U. (2010). Multidimensional assessment of empathic abilities: neural correlates and gender differences. *Psychoneuroendocrinology*, *35*(1), 67-82.

Epp, K. M. (2008). Outcome-based evaluation of a social skills program using art therapy and group therapy for children on the autism spectrum. *Children & Schools*, *30*(1), 27-36.

Ellis, R. (2001). Movement metaphor as mediator: a model for the dance/movement therapy process. *The Arts in Psychotherapy*, *28*(3), 181-190.

Faras, H., Al Ateeqi, N., & Tidmarsh, L. (2010). Autism spectrum disorders. *Annals of Saudi medicine*, *30*(4), 295.

Fabbri-Destro, M., Cattaneo, L., Boria, S., & Rizzolatti, G. (2009). Planning actions in autism. *Experiential Brain Research*, 192(3), 521-525.

Frith U., Frith C. D. (2003). Development and neurophysiology of mentalizing. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 29 459–473 10.1098/rstb.2002.1218

Frith U., Happé F. (1994). Autism: beyond "theory of mind." *Cognition* 50 115–132 10.1016/0010-0277(94)90024-8

Gaigg S. B. (2012). The interplay between emotion and cognition in autism spectrum disorder: implications for developmental theory. *Front. Integr. Neurosci.* 6:113 10.3389/fnint.2012.00113

Gallese, V., Rochat, M. J., & Berchio, C. (2013). The mirror mechanism and its potential role in autism spectrum disorder. *Developmental Medicine & Child Neurology*, *55*(1), 15-22.

Hamilton, A. F. D. C. (2013). Reflecting on the mirror neuron system in autism: a systematic review of current theories. *Developmental cognitive neuroscience*, *3*, 91-105.

Haque, S., & Haque, M. (2015). ART THERAPY AND AUTISM. *ART THERAPY*, *8*(6).

Hurt, C., & Ounsted, C. (1966). The biological significance of gaze aversion with particular reference to the syndrome of infantile autism. Behavioural Science, 11, 346-356.

Jones A. P., Happé F. G. E., Gilbert F., Burnett S., Viding E. (2010). Feeling, caring, knowing: different types of empathy deficit in boys with psychopathic tendencies and autism spectrum disorder. *J. Child Psychol. Psychiatry* 11 1188–1197 10.1111/j.1469-7610.2010.02280.x

Kim, J., Wigram, T., & Gold, C. (2008). The effects of improvisational music therapy on joint attention behaviors in autistic children: a randomized controlled study. *Journal of autism and developmental disorders*, *38*(9), 1758.

Koch, S. C., Mehl, L., Sobanski, E., Sieber, M., & Fuchs, T. (2015). Fixing the mirrors: A feasibility study of the effects of dance movement therapy on young adults with autism spectrum disorder. *Autism*, *19*(3), 338-350.

Kohler, E., Keysers, C., Umilta, M. A., Fogassi, L., Gallese, V., & Rizzolatti, G. (2002). Hearing sounds, understanding actions: action representation in mirror neurons. *Science*, *297*(5582), 846-848.

Levy, F. J. (1988). *Dance/Movement Therapy. A Healing Art*. AAHPERD Publications, PO Box 704, Waldorf, MD 20601.

Martin, M. (2014). Moving on the spectrum: Dance/movement therapy as a potential early intervention tool for children with Autism Spectrum Disorders. *The Arts In Psychotherapy*, *41*(5), 545-553.

Rizzolatti, G., & Craighero, L. (2004). The mirror-neuron system. *Annu. Rev. Neurosci.*, *27*, 169-192.

Rogers, S. J., Hepburn, S. L., Stackhouse, T., & Wehner, E. (2003). Imitation perfor- mance in toddlers with autism and those with other developmental disorders. Journal of Child

Psychology and Psychiatry, *44*(5), 763–781.

McGarry, L. M., & Russo, F. A. (2011). Mirroring in dance/movement therapy: Potential mechanisms behind empathy enhancement. *The Arts in Psychotherapy*, *38*(3), 178-184.

Samaritter, R. & Payne, H. (2017). Through the Kinesthetic Lens: Observation of Social Attunement in Autism Spectrum Disorders. *Behavioral Sciences (2076-328X),* 7(1)

Schulte-Rüther, M., Markowitsch, H. J., Fink, G. R., & Piefke, M. (2007). Mirror neuron and theory of mind mechanisms involved in face-to-face interactions: a functional magnetic resonance imaging approach to empathy. *Journal of cognitive neuroscience*, *19*(8), 1354 1372.

Schwenck C., Mergenthaler J., Keller K., Zech J., Salehi S., Taurines R., et al. (2012). Empathy in children with autism and conduct disorder: group-specific profiles and developmental aspects. *J. Child Psychol. Psychiatry* 53 651–659 10.1111/j.1469-7610.2011.02499.x

Stern, D. (1985). *The interpersonal world of the infant.* New York: Basic Books.

Tortora, S. (2006). *The dancing dialogue*. Baltimore: Brooks.

Umilta, M. A., Kohler, E., Gallese, V., Fogassi, L., Fadiga, L., Keysers, C., & Rizzolatti, G. (2001). I know what you are doing: A neurophysiological study. *Neuron*, *31*(1), 155-165.

Vivanti, G., & Rogers, S. J. (2014). Autism and the mirror neuron system: insights from learning and teaching. *Phil. Trans. R. Soc. B*, *369*(1644), 20130184.

Wigram, T., & Gold, C. (2006). Music therapy in the assessment and treatment of autistic spectrum disorder: clinical application and research evidence. *Child: care, health and development*, *32*(5), 535-542.

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, MA

Student's Name: MEGAN FITZPATRICK

Type of Project: Thesis

Title: MIRRORING, SOCIAL LEARNING AND DANCE MOVEMENT THERAPY WITH CHILDHOOD AUTISM SPECTRUM DISORDER: A LITERATURE REVIEW

Date of Graduation: 5/19/18

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

Thesis Advisor: R Zarate