



Moving on the spectrum: Dance/movement therapy as a potential early intervention tool for children with Autism Spectrum Disorders[☆]



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ABSTRACT

The rising number of Autism Spectrum Disorder (ASD) diagnoses, in addition to the ability to recognize the disorder early, has led to much interest in early intervention tools. This theoretical work examines how dance/movement therapy (DMT) might be applied to address the early developmental connections between social and communication challenges and early motor maturation in young children diagnosed with ASDs. As a foundation for this discussion, literature pertaining to the early relationship of motor challenges and social/communication deficits is reviewed. A theoretical framework is proposed that promotes the integration and early development of these two realms based on DMT interventions and principles in children at high risk for or diagnosed with an ASD.

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The most recent report from the Centre for Disease Control and Prevention (CDC) estimated that 1 in 68 children is diagnosed with an Autism Spectrum Disorder (ASD) in the United States (CDC, 2010). As the number of children with an ASD diagnosis continues to grow, so too does the interest and research dedicated to studying early diagnosis and effective interventions. There are many perspectives that attempt to understand what autism is and what interventions are best-suited for individuals diagnosed with ASDs. There has been a recent shift in the way many view autism. For instance, rather than seeing individuals on the spectrum as strictly 'disabled', it is now a common understanding that such individuals may think and act in a different way than those without the disorder. Furthermore, this neurodiversity comes not only with challenges but also many opportunities. Therefore, rather than focusing on 'fixing' the way individuals on the autism spectrum behave (as there is nothing broken) to fit the social norm, the focus has turned to developing strengths and encouraging the ability to share such strengths with the world (Donnellan, Hill, & Leary, 2012; Shore, 2008). However, challenges in social and communication skills can often become barriers to the full expression of strengths and prevent individuals with ASDs from reaching their fullest potential (Shore, 2008). Donnellan et al. (2012) explain that their own experiences, as well as self-advocate reports, "have

taught us that individuals with autism often are aware of their idiosyncrasies, may not be able to control them but do want communication, participation and relationship" (p. 3).

Although functionality ranges greatly along the autism spectrum, some commonalities experienced by individuals with ASDs include feelings of social isolation, loneliness, and frustration, which result from difficulties communicating with others (Bauminger & Kasari, 2000; Donnellan et al., 2012; Müller, Schuler, & Yates, 2008; Shore, 2008). For this reason, this study attempts to address how individuals diagnosed with ASDs might better learn to communicate and become more engaged with the world around them. Research shows that the understanding of communication, as well as communication abilities, begin to develop very early in life (Legerstee, Haley, & Bornstein, 2013; Trevarthen, 1979). Therefore, this theoretical work addresses some of the challenges that are observed in these very early stages in children at high risk for or diagnosed with ASDs. Specific attention is given to the social/communicative challenges and their relationship to motor difficulties.

More specifically, this article explores how the field of dance/movement therapy (DMT) could aid in the development of social and communication skills with the goal of supporting individuals with ASDs in meeting their fullest potential. The creative arts therapy DMT uses movement to integrate the emotional, cognitive, physical and social aspects of an individual (American Dance Therapy Association, 2009). Because the development of social and communication skills begins early in life, DMT is especially appropriate in a non-verbal, body-based context. Furthermore, recent literature points towards a coupling of motor development and

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social/communicative maturation and suggests that this coupling is observed to be challenged early in children at high risk for, or diagnosed with, ASDs (Baranek, 1999; Landa, 2007; McCleery, Elliott, Sampanis, & Stefanidou, 2013; Toth, Munson, Meltzoff, & Dawson, 2006; Trevarthen & Delafield-Butt, 2013). DMT interventions can be utilized to address this developmental connection in infants and young children with, or at high risk for, ASDs.

Until recently, motor deficits and social/communication deficits were viewed in separate arenas within the field of autism research. Social and communication challenges have been a part of the diagnosis of autism since its beginnings with Dr. Leo Kanner in the 1940s (Kanner, 1943). In fact, the word *autism* comes from the Greek *autos* meaning self, referring to the sense of an isolated self, removed from social interaction (<http://www.webmd.com/brain/autism/history-of-autism>). Social and communication challenges have been, and continue to be, major focuses of autism research and intervention.

Motor deficits have also shared a long history with the diagnosis of autism, although they are not seen as a *core deficit* (to be defined later in this study), as are social and communication deficits. Motor deficits were also initially described by Kanner (1943), who observed that his clients were “somewhat clumsy in gait and gross motor performances” (p. 248). Motor challenges were eventually included in a list of possible criteria for an autism diagnosis in the *Diagnostic and Statistical Manual of Mental Disorders – Third Edition* (DSM-III) in 1980 as ‘oddities of motor movement’ (American Psychiatric Association, 1980). It should be noted that some researchers in the field deny the existence of motor challenges in ASDs (Mulick, Jacobson, & Kobe, 1993; Rimland, 1993). However, an increasing amount of recent literature points to significant motor challenges seen across the autism spectrum (see Fournier, Hass, Naik, Lodha, & Cauraugh, 2010).

Motor challenges experienced by individuals with ASDs are generally addressed by physical and occupational therapists, whereas social and communication challenges are most often addressed by speech/language pathologists and behavioural therapists. These two different areas of deficit have only recently been viewed as connected in autism research, and so, they have only been explored together to a limited extent in the context of early intervention. Some researchers, such as Bhat, Iverson, Landa, Galloway, and McCleery (among others), have performed research into the pairing of early motor challenges and social/communication challenges found in children with ASDs. New research in the field reveals that the development of movement and of development of communication and social understanding are intimately connected with one another early in life. As Iverson (2010) explains, infants acquire and refine a whole set of new motor skills within their first eighteen months “that fundamentally transform their experiences with objects and people” (abstract). Furthermore, this early developmental coupling has been shown to be challenged in children with and at high-risk for ASDs (Landa, 2007; McCleery et al., 2013; Toth et al., 2006).

When searching for interventions that specifically address the developmental pairing of motor and social/communication challenges, there are few models to consult and even fewer in the realm of early intervention. Some examples that do attempt this are Greenspan’s Floortime Approach (Greenspan & Wieder, 2006), Reciprocal Imitation Training (Ingersoll & Schreibman, 2006), and Early Start Denver Model (Rogers & Dawson, 2010). However, in general, these models encompass many aspects of assessment and intervention in ASDs. This study proposes that the field of dance/movement therapy (DMT) is particularly suited to address the specific coupling of early movement and social/communication challenges that have recently been linked in the autism literature. Dance/movement therapists “view the body as both expressive and

communicative and use it both as a method of assessing individuals and the mode for clinical intervention” (Devereaux, 2012, p. 334).

This theoretical paper will first review the literature pertaining to the connections of early motor delays and social/communication challenges that are often observed in children on the autism spectrum. Because such challenges begin at an early age, and because recent findings support the ability to diagnose children with ASDs at a very young age (see Volkmar, Lord, Bailey, Schultz, & Klin, 2004), this article will focus on early development and intervention in children between the ages of zero and five years. A theoretical framework based on dance/movement therapy will be explored as a potential early intervention tool to address the emerging motor, social, and communicative challenges of young children and infants at high risk for or diagnosed with an ASD.

Literature review

Autism Spectrum Disorder

ASD is a developmental disorder whose description has continued to evolve, from its original understandings by Kanner (1943) as an autistic disturbance, to the latest criteria of diagnosis in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-V). Currently, ASD is diagnosed according to “persistent deficits in social communication and social interaction across multiple contexts” and “restricted, repetitive patterns of behaviour, interests, or activities” (American Psychiatric Association, 2013, p. 50). According to the recent changes to the diagnosis of ASD in the DSM-V, the aforementioned symptoms must be present in the early developmental period, even if they do not manifest until later (American Psychiatric Association, 2013). 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 (American Psychiatric Association, 2013). Regardless of where an individual may fall in terms of the severity of symptoms along the spectrum, there are shared impairments in social and communication skills from an early age (McCleery et al., 2013; Volkmar et al., 2004; Wetherby, Watt, Morgan, & Shumway, 2007). It is on such impairments that this study aims to focus, with a special attention given to their relationship to atypical motor development.

Social/communicative functioning in ASD

Due to the variation and degree of symptoms that define ASDs, many researchers have aimed to establish the core deficits associated with the autism spectrum (Sigman, Dijamco, Gratier, & Rozga, 2004; Wetherby et al., 2007). A deficit is considered to be core “if it is unique to autism, specific rather than general, and universal” (Sigman et al., 2004, p. 221). According to Greenspan and Wieder (2006), past research showed that developmental deficits observed in children with ASDs include the following: empathy and theory of mind (Baron-Cohen, 1991); higher-level abstract thinking (Minshew & Goldstein, 1998); joint attention (Mundy, Sigman, & Kasari, 1990); emotional reciprocity (Baranek, 1999; Dawson & Galpert, 1990); and functional language (Wetherby & Prizant, 1993). The common thread running through these deficits is social/communication skill development and functioning. Wetherby et al. (2007) explain that social/communication deficits are central to ASDs and include a “broad array of verbal and nonverbal behaviours used in reciprocal social interaction” (p. 960).

Communication

Communication is a broad term that can include aspects of linguistic, paralinguistic, and pragmatic functioning (Landa, 2007).

Social understanding and development are difficult to separate from the development of communication. In particular, the paralinguistic and pragmatic aspects of communication can be directly linked to social development. Bates (1976) (as cited in Baron-Cohen, 1988) explains that pragmatics is the use of speech and gesture in a communicative way that is socially appropriate. For instance, eye gaze, facial expression, and gestures are all uses of pragmatic communication. These features of communication also contribute to the synchrony (back-and-forth rhythm of interacting) and to the understanding of social communication (Landa, 2007). Paralanguage is a way of communicating meaning through non-phonemic aspects, including, but not limited to, proxemics (the space between speaker and listener) and the intonation of the voice, which are also intimately woven into social context and understanding.

Social/communication deficits

Because the developments of social understanding and communication are so closely linked in early life, they will be coupled together as “social/communication” for the purpose of this study. As mentioned, research indicates that children diagnosed with ASDs show a variety of deficits in the realm of social/communicative functioning. Such deficits can include a lack of appropriate eye gaze, a lack of vocalizations, and a lack of sharing of enjoyment or interest (Wetherby et al., 2004, 2007). Furthermore, children with ASDs are less likely to orient to social stimuli, to respond to the social bids of others, and to initiate social interactions with others (Dawson, Meltzoff, Osterling, Rinaldi, & Brown, 1998; Hauck, Fein, Waterhouse, & Feinstein, 1995; Sigman & Ruskin, 1999). The range of ability in verbal communication varies along the spectrum; however, before verbal language is acquired, non-verbal skills in social/communication development are often difficult for children with ASDs and can have an impact on future development. Such skills include gesturing, joint attention, and imitation.

For instance, Mundy, Sigman, Ungerer, and Sherman (1986) found that deficits in non-verbal indicating behaviours, or joint attention, are characteristic in children diagnosed with ASDs. In fact, many studies suggest that difficulties in joint attention ability are prevalent in ASDs (Dawson et al., 1998; Mundy et al., 1986; Toth et al., 2006). Joint attention refers to “the ability to share a common focus of attention with another person (e.g., looking in the direction that another person is looking, following a pointing gesture)” (Volkmar et al., 2004, p. 143). This ability to engage with another individual and the environment is an essential aspect of social learning. Once typically developing infants understand the gestures and actions of others, they can begin to produce such communicative and symbolic gestures themselves, increasing their own communication and language development (Bates & Dick, 2002; McCleery et al., 2013). Research shows that impairments in joint attention behaviours are core to ASDs and are evident in young children at high risk for and diagnosed with ASDs (Goldberg et al., 2005; Wetherby et al., 2007).

Another social/communication difficulty that children with ASDs exhibit is impairment in imitation abilities (Hobson & Lee, 1999; Rogers & Bennetto, 2000; Rogers & Pennington, 1991; Rogers, Hepburn, Stackhouse, & Wehner, 2003). Imitation emerges early in life and continues to develop, laying a foundation for social connectedness and emotional sharing (Rogers et al., 2003; Stern, 1985; Trevarthen, Kokkinaki, & Fiamenghi, 1999). Infant imitation is significant in that it allows an infant to learn about other's actions and intentions (Meltzoff, 1999; Toth et al., 2006). Landa (2007) also explains that imitation is closely tied to learning communication, providing a “vehicle for communicative reciprocity” (p. 20).

Motor development in ASD

Although motor development delays are not considered to be diagnostic of ASDs, it is common to see evidence of such deficits across the spectrum and beginning at an early age (Baranek, 1999; Landa, 2007; Liu, 2012; McCleery et al., 2013). In fact, Fournier et al. (2010) expressed in their meta-analysis that motor difficulties should be considered a ‘cardinal feature’ of ASDs (p. 1227) and argued such to be a ‘potential core feature’ (p. 1237). However, Miyahara (2013) found in his meta-analysis that there are individuals with ASD who do not show movement problems and stated that movement disturbances should therefore not be considered a core deficit. Regardless of whether motor challenges are considered core, there is enough research to suggest they are prevalent in those diagnosed with ASDs.

Motor challenges

In recent years, a number of motor difficulties attributed to individuals with ASDs have been examined, ranging from early motor delays to later deficits in motor coordination. Motor difficulties associated with gait (Nobile et al., 2011), postural control/stability (Vernazza-Martin et al., 2005), fine and gross motor skills (Provost, Lopez, & Heimerl, 2007), dyspraxia (Dziuk et al., 2007), and imitation (Charman et al., 1997; Stone, Ousley, & Littleford, 1997; Toth et al., 2006; Williams, Whiten, Suddendorf, & Perrett, 2001), are among the motor deficits commonly observed in individuals with ASDs. Atypical motor development in young children is prevalent in the ASD population (Baranek, 1999; Provost et al., 2007; Rogers, 2009). Motor challenges begin to present early in infants who are at risk for and later diagnosed with ASDs, with studies showing disturbances as early as four months of age (Provost et al., 2007). Specific early motor challenges as they relate to social/communication deficits will be discussed more thoroughly in the following section.

The relationship of motor and social/communicative development

In a recent review of the literature, McCleery et al. (2013) suggest that infants and young children with ASDs show “deficits and/or delays in a number of motor-related milestones” (p. 3) and that many of these deficits are “concurrently and/or predictively associated with important speech/language and social communication abilities” (p. 3). Prizant (1996) presented the effects of motor limitations on speech, communication, and social development, particularly related to motor planning deficits. When compared to typically developing controls, Fournier et al. (2010) in their meta-analysis of the data found that individuals diagnosed with ASDs show pronounced motor delays in areas such as motor coordination, arm movements, gait, and postural stability. These deficits appear in other research in addition to motor difficulties associated with imitation (Stone et al., 1997; Williams et al., 2001) and have been related to social and communication deficits. Notably, many of these deficits can be recognized in the first two years of life (McCleery et al., 2013).

Landa (2007) explained that “motor and vocal systems are tightly coupled in infancy” (p. 20). Examples of such a ‘coupling’ of these two systems are observed in an infant's reciprocal vocalizations, eye gaze, and imitation of mouth opening. The coordination of vocal and facial motor activity emerges in the first six months of life (Iverson & Fagan, 2004). This synchronicity of interactions is believed to be a precursor for later communication and language development (Iverson & Fagan, 2004; Landa, 2007; McCleery et al., 2013). Studies show that infants and children at high risk for or diagnosed with ASDs display abnormal communicative synchronicity as early as four months (Brisson, Warreyn, Serres, Foussier, & Adrien-Louis, 2012; Landa, 2007; Yirmiya et al., 2006).

Another motor development that co-occurs with communicative functioning and which relates to the notion of synchronicity is repetitive or rhythmic arm movements. At 6–11 months, typically developing infants display rhythmic arm movements prior to, and co-occurring with, the emergence of reduplicative babbling (e.g., “baba”) and eventually babbling, indicating another connection of vocal and motor systems (Iverson & Thelen, 1999; Landa, 2007). McCleery et al. (2013) point to Iverson and Wozniak (2007), who demonstrated a deficit in the pairing of reduplicative babbling and rhythmic arm movement in high-risk infants and in children later diagnosed with ASDs.

The mirror neuron system (MNS), which provides motor resonance functioning in the brain, is also believed to be impaired in individuals with ASDs and has implications of impacting motor and social/communicative interactions (Iacoboni & Dapretto, 2006; McCleery et al., 2013). The MNS is “directly involved in imitation of simple movements, in the learning of complex skills through imitation, in the perception of communicative actions, and in the detection of action intentions” (Gallese, 2008, p. 770). In essence, just like a mirror, the same neurons are activated in an observer as the individual who is actually performing an action or the expression of an emotion or behaviour (Berrol, 2006). Imitation also generalizes to “providing the child with shared social experiences, a sense of mutual connectedness, and a means of communication between social partners (Meltzoff, 2005; Trevarthen et al., 1999)” (as cited in Toth et al., 2006). According to Toth et al. (2006), within the ASD population, imitation deficits are found in object imitation, imitation of facial and body movements, and deferred imitation of actions on objects. Falck-Ytter, Gredeback, and von Hofsten (2006) reported that the ability to predict another’s actions begins to form in the second half of the first year of life. It should be noted that Ramachandran and Oberman (2007) previously proposed a theory of ‘broken’ mirror neurons in individuals diagnosed with ASDs. However, more recent findings suggest the MNS in individuals with ASDs is not ‘broken’ but rather experiences reduced activity as a result of reduced social engagement (Becchio & Castiello, 2012; Oberman et al., 2005).

McCleery et al. (2013) report that skills related to joint attention, such as shared visual attention and following a pointing gesture, begin to emerge in typically developing infants at approximately 10–20 months of age. As mentioned, joint attention, which links motor, speech, and language development, is often a major deficit observed in children diagnosed with ASDs. Wetherby et al. (2007) found that “children with ASD performed significantly lower on five social communication measures – gaze shifts, gaze/point follow, rate of communicating, acts for joint attention, and inventory of conventional gestures” (p. 970), and such deficits should be evident by 18–24 months. Other studies have shown early deficits in understanding gesture (Goldberg et al., 2005; Charman, 2003) as well as gesture production and the coordination of gesture and speech (Lord et al., 2000) in young children with ASDs.

It can be seen that motor skills and social/communication development are related and that this relationship emerges early in life. Additionally, children diagnosed with ASDs who exhibit deficits in these areas require intervention as early and as effectively as possible to aid in proper development. There are some early intervention models addressing both the motor and social/communication impairments observed in ASDs. McCleery et al. (2013) review the existing and emerging motor interventions relevant to increasing social/communication skills in children diagnosed with ASD, including the following: sign language; Picture Exchange Communication System (PECS); Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT); Auditory Motor Mapping Treatment; Early Start Denver Model (ESDM); and Reciprocal Imitation Training (RIT). Dance/movement therapy is an intervention that has not been discussed thoroughly in the literature but which may be able

to aptly address the link of early motor and social/communication deficits commonly displayed in ASDs.

Dance/movement therapy

As described by the American Dance Therapy Association (ADTA), dance/movement therapy (DMT) is the “psychotherapeutic use of movement to further the emotional, cognitive, physical and social integration of the individual” (ADTA, 2009). DMT emerged in the 1940s and 1950s as a result of a growing interest in the nonverbal and expressive aspects of personality (Levy, 2005). Tortora (2006) explains that DMT uses movement, body awareness, dance, and relaxation techniques to facilitate changes on all developmental levels. The movement interventions and movement observational tools used by the dance/movement therapist can be valuable assets in working with young children and infants, particularly those who are non-verbal (Tortora, 2006). Loman and Foley (1996) also report that DMT is well-suited for working with infants and children because children communicate first through their bodies, before verbal language develops. This notion is in agreement with the previous discussion of early motor and social/communicative development.

DMT and ASD

Dance/movement therapists have long worked with the ASD population. Janet Adler is well known in the field for her early work with children with autism, which is the focus of her 1970 classic film *Looking For Me* (Tortora, 2006; Levy, 2005). Adler and other dance/movement therapists that followed (see Erfer, 1995; Tortora, 2006; Devereaux, 2012) explored the use of reflection, attunement, synchronous movement interactions, mirroring, and rhythm as ways of connecting with and encouraging communication in children on the autism spectrum. Unfortunately, there are few evidenced-based, quantitative research studies on the efficacy of using DMT as an early intervention for ASD. This theoretical work proposes a rationale for the use of DMT interventions that address specific areas of deficit observed in early development in children at high-risk for or diagnosed with ASD. This proposal is given in the hopes that more research will be conducted to quantify the results of such interventions.

DMT interventions have the potential to provide a pathway to the integration of the motor and social/communicative functions that are affected in children with ASDs. Devereaux (2012) notes that current research supports the inclusion of the body and relational experiences for the development of a child’s brain and that the embodied interventions utilized within DMT can help children with ASDs increase their capacity for social connectedness. Because DMT provides a holistic approach that integrates the body and mind, and because it can thrive in the non-verbal realm of communication, this type of therapy is extremely appropriate for the early intervention of children on the autism spectrum.

A dance/movement therapy perspective on early treatment of ASDs: a theoretical treatment framework and application

The following treatment framework is based on the research provided, utilizing DMT to address the areas of challenge that are observed early in the life of a child at risk for or diagnosed with ASD. The dance/movement therapy interventions discussed below focus on meeting clients on their terms and levels of functioning, encouraging engagement and relationship, aiding in challenges with body awareness and coordination, and expanding and fostering rhythm and synchronization to help integrate the motor and social/communicative functioning of young children on the autism spectrum. Specifically, the DMT technique of mirroring will be explored as a potential tool to foster social connectedness

and increase imitation skills. Deficits in body stability, movement coordination, gesturing, and joint attention will be addressed by reviewing body awareness and coordination assessments and interventions, including Bartenieff Fundamentals (Hackney, 2002) and Tortora's (2006) Ways of Seeing approach. Lastly, DMT interventions focused on the integration of rhythmic movement and communication will be discussed with the intention of encouraging rhythm, synchronicity, and later communication ability.

This framework follows a somewhat developmental approach. However, as Berrol (2006) notes, "early development is a dynamic and multi-dimensional process" (p. 310). Therefore, it is not necessary that the interventions follow one another sequentially, but rather are adjusted and interwoven as required to meet the individual needs of the child. With the individuality of the child in mind, it is also important for the dance/movement therapist to continue to encourage areas of strength and to always be mindful to incorporate the child's individual interests throughout sessions.

Phase one: establishing safety and regulation

To begin building a healthy relationship, a person must feel safe enough to make a connection with another. An appraisal of another person or a stimulus as safe or dangerous results in an approach or avoidance response (Cozolino, 2006). Badenoch and Bogdan (2012) propose that the nervous systems of many children on the autism spectrum are over-responsive to what most would consider neutral experiences, perceiving them as threatening or dangerous. When a threat is perceived, the sympathetic nervous system takes over, causing the body to go into a state of fight, flight, or freeze, and in the interest of survival, the "circuits that connect us with others go offline" (Badenoch & Bogdan, 2012, p. 7). If a child's nervous system is dysregulated in this way, the child will have a decreased ability to connect in a relational manner and have a decreased capacity to take in new information. Furthermore, due to the belief that the regulatory circuitry of children on the autism spectrum is compromised, it is essential to establish a safe and calm environment in which to conduct therapy sessions.

Initial assessing and addressing of functioning

Because children with ASDs vary in their sensitivities and challenges, it is necessary to consider each child's individual needs. Although assessment is outside the reach of this study, before a dance/movement therapist begins working with a child on the autism spectrum, the therapist might benefit from such assessments as family interviews, movement observations, and standardized tests that consider the child's sensory integration capacities and movement range. Then, the therapist can have an idea as to which areas a child shows sensitivity (such as light, sound, texture, etc.) and can adjust the therapeutic space to fit the sensory and regulatory needs of the individual child. In the same way, the dance/movement therapist can recognize and provide objects of interest and comfort for the child within the therapeutic space.

Understanding how the child prefers to communicate is also a way to help the child feel secure upon entering a session (Badenoch & Bogdan, 2012). Some children on the spectrum are more verbally expressive, while others are very limited and/or completely non-verbal (or pre-verbal, in the case of infants). As a dance/movement therapist, the ability to understand and communicate on both a verbal and a non-verbal level becomes a very important skill in allowing a child to feel safe, seen, and understood (Levy, 2005). By allowing children to communicate their needs in a way that is fitting to their level functioning, the therapist can help alleviate feelings of chaos and confusion. In essence, a therapist must create a safe and less overwhelming environment that aims to meet the individual regulatory needs of a child with an ASD. Movement, being a universal form of communication, is also the first form of communication

amongst humans and can serve as a meeting place for therapist and a young client. It is through recognizing and addressing sensitivities and meeting clients on their own levels of relating/functioning that a therapist can create a safe space and begin to facilitate embodied interactions.

Phase two: building connection and encouraging engagement

As Shore (2008) explained in reference to working with children with ASDs, "before any successful interaction, instruction, or relationship is going to occur, a connection has to be made" (p. 62). Once the environment is established and presents a safe and calming atmosphere in which a child with an ASD can begin to engage, the dance/movement therapist can start to forge a connection with the child. Children on the autism spectrum are often described as aloof, distant, and disengaged, giving more attention to a toy or an object than to another human being. Bhat, Galloway, and Landa (2010) looked at infants at high risk for autism and showed that these infants "spent less time attending to a caregiver and more time attending to a non-social stimuli" (p. 995) than infants who were considered low risk for developing autism. Bhat et al. (2010) also reported that when caregivers 'actively engaged' these high-risk infants, the infants exhibited "typical levels of social gaze" (p. 995). So, although engagement with another person may not present typically in children with or at high risk for ASDs, it is possible to achieve when the child is actively engaged.

Mirroring

An intervention tool that can aid in actively engaging a child and that is very familiar to the dance/movement therapist is mirroring. Tortora (2006) defines the term mirroring as "a process that involves a therapist literally embodying the exact shape, form, movement qualities, and feeling tone of another person's actions, as if the therapist were creating an emotional and physical mirror image" (p. 259). The dance/movement therapist, with training in movement analysis, is not only able to mirror the exact movements of a client but can also attune to and reflect back the quality and emotionality of the client's overall mood and affect. Mirroring can be used to help create a connection between therapist and client as well as to encourage meaningful imitation skills and social engagement (Berrol, 2006; Tortora, 2006).

As previously mentioned, the MNS is believed to be impaired in children with ASDs, perhaps due to abnormal development (McGarry & Russo, 2011; Williams et al., 2001). The MNS functions as a way in which humans connect others' actions/movements to emotion, intention, and their own experiences. As explained by Gallese (2009), "it is the body state shared by observer and observed that enables direct understanding" (p. 771). Moreover, although children with ASDs have some ability to imitate, Landa (2007) explains that they "rarely exhibit spontaneous, meaningful, and socially engaged imitation of others' actions on objects, vocalizations, and body movements" (p. 20). Through mirroring, the dance/movement therapist aims to achieve not only an increased ability in the child to imitate, but to actually share in and reflect the body state of the client.

Several studies have now linked the DMT intervention of mirroring to the MNS as a means to increase empathy, attunement, and social interactions with a client, including those on the autism spectrum (Behrends, Müller, & Dziobek, 2012; Berrol, 2006; Homann, 2010; Winters, 2008). One clinical study by Fields, Sanders, and Nadel (2001) found that children with autism who had been intentionally mirrored by adults demonstrated increased socialized behaviour and engaged in more reciprocal play than those who had not been mirrored (as cited in Homann, 2010). If increased intentional mirroring is provided for an infant or young child with an

ASD at an early age, it may result in better social and communication skills as the child develops. Mirroring can be used as a method to make contact and begin to form a relationship with a child, to promote imitation skills and social interaction, and even as a technique to help the young child become aware of his/her own body, as will be discussed in the next section.

Phase three: body awareness and motor coordination

Erfer (1995) explained that “children must understand their own bodies and their capacity for movement before they can cope with the external demands of the environment” (Levy, ed., p. 198). Developmentally speaking, to attain the skills required to communicate, learn language, and other more advanced social skills, a child must first be able to establish a sense of self through body awareness and movement. Hannaford (2005) expressed that “movement activates the neural wiring throughout the body, making the whole body the instrument of learning” (p. 18). A child learns through developmental movement sequences about how his/her own body relates to itself and how it relates to the environmental surroundings (Hackney, 2002). This physical and emotional process typically begins through attuning in early relationships (Cozolino, 2006). However, if a child is unable to attune and engage in early positive physical and emotional interactions, perhaps due to the neurobiological underpinnings of ASD, the child’s ability to understand his/her own body will be compromised and effect other areas of development (Cozolino, 2006; Erfer, 1995; Tortora, 2006).

Cozolino (2006) expresses this notion well, explaining that some individuals diagnosed on the autism spectrum may have difficulties with “theory of mind” (the ability to understand another’s perspective) because they lack a “theory of body” and emotional experiences on which to build a cohesive sense of self (p. 289). Other studies point to deficits in body awareness, self-other awareness, motor coordination, and later social/communication skills (Bhat, Landa, & Galloway, 2011; Dawson & McKissick, 1984; Fabbri-Destro, Gizzonio, & Avanzini, 2013; McCleery et al., 2013). The dance/movement therapist can aim to encourage and increase a child’s theory of body by beginning with interventions that focus first on body parts and basic coordination, continuing to encourage a child’s sense of self and ability to relate to others and the environment. Two examples of such interventions dance/movement therapists may utilize are Bartenieff Fundamentals (Hackney, 2002) and the body organization actions found in Tortora’s (2006) Ways of Seeing approach, which will each be briefly touched upon here.

Bartenieff Fundamentals

The Bartenieff Fundamentals refer to Irmgard Bartenieff’s theory of full body integration, based on Rudolf von Laban’s work, and focuses on organization of the body and its parts as it relates to itself and to the environment (Hackney, 2002). These patterns of movement progress developmentally, and if a pattern is not achieved (for example, due to motor deficits observed in ASD), it may not effectively support the next stage of development, leading to physical or psychological problems (Hackney, 2002). Hackney (2002) put forth the six Patterns of Total Body Connectivity, which evolved from the Bartenieff Fundamentals, beginning with the first pattern of breath and ending with cross-lateral connectivity. Each pattern “organizes a way of relating to self and to the world” (Hackney, 2002, p. 13). In working with an infant or young child with an ASD, it could be useful to resource the Bartenieff Fundamentals to both assess delays and strengths in early body organizational development and to intervene and encourage patterns where necessary. For instance, Hackney (2002) offers that the developmental step of learning to push to reach for something is a very empowering milestone for a young child, encouraging a sense of self-activation. The dance/movement therapist might encourage this movement

pattern with a young client by “playing games of pushing” (Hackney, 2002, p. 118) or can provide extra grounding for the child to push against in order to reach a desired object. Similarly, Tortora’s Ways of Seeing approach utilizes both Laban Movement Analysis and Bartenieff Fundamentals to create four categories promoting body organization and action (Tortora, 2006).

Organizing body actions: Ways of Seeing approach

Tortora (2006) explains in her book, *The Dancing Dialogue*, that the dance/movement therapist can help a young client to organize body actions through the following categories: (1) the limbs in relation to the torso; (2) specific body coordinations; (3) awareness of body actions; and (4) overall sense of body actions. Moving through these categories, the dance/movement therapist can observe and creatively intervene where necessary, beginning with how the child’s body moves in relation to its parts and the body as a whole. Next, the therapist can observe how the body parts work or do not work together as a whole to create an action, as well as what awareness the child has of such actions and different body parts. Lastly, the dance/movement therapist can analyze the overall sense and quality of the body and body actions in a larger scope. In working with a child with ASD, Tortora’s (2006) categories can aid the therapist in understanding the child’s sense of self, the emotional experience of the child, as well as the child’s environmental sensitivities.

Both Erfer (1995) and Devereaux (2012) utilize an intervention idea of greeting different body parts at the beginning of a session with children with ASDs. Devereaux (2012) explains that first each body part is greeted and then experimented with how it wants to move. Erfer (1995) encouraged clients to recognize and name body parts with the use of a prop (such as a ball) that was physically placed on each part. Tortora (2006) often incorporates a physioball in interventions to aid in a child’s experience of weight shifting, balance, and body adjustments and uses touch to “support a child’s movement initiations, continuations, or completions” (p. 293). These interventions aim to help a child better attain skills that are often seen as developmental challenges (and that are believed to lead to later deficits) in young children with ASDs, including motor coordination, joint attention, and gesturing.

Both the Bartenieff Fundamentals and the Ways of Seeing approach guide a therapist in assessing a child with ASD in abilities and deficits as related to developmental movement, body awareness, and self-other awareness. With the information provided by the above techniques, the dance/movement therapist cannot only better understand how the child is relating to self, others, and the environment but can also begin to promote and encourage improved body awareness and coordination through such embodied interventions.

Phase four: rhythm and timing

Rhythm is present in human life from its very start; the heart-beat and breath (both that of the mother’s, in utero, and the infant’s postnatally) and circadian rhythms (daily cycles of sleep and wake, hunger, body temperature, brain waves, hormones) are essential parts of human existence. Very soon after birth, an infant and caregiver begin to fall into ‘sync’ with one another in a reciprocal, non-verbal, interactive relationship (Cozolino, 2006; Feldman, 2007; Trevarthen, 2011). This rhythmic ‘dance’ of relationship has meaning for the continuing growth and development of the child. It can effect attachment, communication, social understanding, and later verbal communication skills and motor coordination (Cozolino, 2006; Hannaford, 2005). Amos (2013) explained that “people diagnosed with ASD often appear to experience states that fluctuate more widely and more often, sending them out of sync with typical daily rhythms” (p. 2). Furthermore, if the internal

rhythms of a child are dysregulated, caregivers may find it more difficult to synchronize their own rhythms and style of communication with that of the child (Amos, 2013).

As mentioned above, children who were later diagnosed with ASDs showed a deficit in rhythmic arm movements related to reduplicative babbling (Iverson & Thelen, 1999), which is a good example of a coupling of rhythmic body movement and communication skills that seems to be disrupted early in a child with an ASD. As Iverson (2010) explains, “the rhythmic hand and arm movements that emerge prior to reduplicated babble onset allow infants to practice rhythmically organized, tightly timed actions of the sort required for babbling” (p. 254). Both the action of the movement of the limb and the timing of such with vocal sounds should be addressed in interventions with children diagnosed with ASDs. Addressing both the internal rhythms of children at risk for or diagnosed with ASDs, as well as their ability to synchronize with external rhythms of their environments, could be useful for further development of communication and social interactions.

Embodied rhythmic interventions

DMT incorporates the use of rhythm in a variety of ways. The dance/movement therapist utilizes rhythm to attune to the client, to facilitate interaction and communication and to help organize the client's thoughts and feelings (Levy, 2005). Finding a natural rhythm in a young child with an ASD may be a place to begin. For instance, if a child begins rocking back and forth, or flaps a particular body part up and down, the dance/movement therapist can begin to attune to the child's rhythm and reflect it back (perhaps through the mirroring technique mentioned above). In this way, the child can feel seen and related to on a social level and then from this place of attunement, the dance/movement therapist can begin to draw attention to the rhythm by emphasizing the movement. Deepening from there, the dance/movement therapist may choose to enhance, grow, and eventually begin to add to or change the rhythm as a way to expand the child's repertoire and experience with rhythm.

Many children's songs, games, and nursery rhymes provide repetitive rhythmic stimulation. It is important to note that, although these can provide ways for a child to feel and hear rhythms, it is essential the dance/movement therapist continues to make the interventions relational, expressive, and embodied. Exaggerating facial expression, tone of voice, and emotion can all be useful. Landa (2007) explains that

“in early intervention, vocalization may be enhanced when communication-based activities occur within tasks having predictable limb movement, simple rhythmic patterns (e.g., song-gesture games in which the child's arms are gently moved in a rhythmic pattern that keeps time with the production of simple, repetitive vocal patterns), ample response time, and secure physical positioning” (p. 20).

Games that provide a back-and-forth motion or turn-taking, such as rolling a ball (or any mobile object of interest to the child, i.e., toy cars) between therapist and client, might also be used to encourage the rhythmic, back-and-forth nature of communication. Within all of these activities, the therapist can choose, depending on the child, to incorporate vocal sounds or verbally reflect the rhythms and actions being displayed as a way to promote the connection of the non-verbal physical movements to the verbal, cognitive brain.

Conclusion

By focusing on a child's functioning in the realms of body awareness, motor coordination, rhythm and timing, the dance/movement therapist can begin to address the early correlations and challenges

observed in motor and social/communicative functioning of children with ASDs. The importance of addressing the developmental coupling of motor and social/communicative deficits as early as possible cannot be over-emphasized due to the cascading effects they have on continuing development. It is also imperative to aid children at risk for and diagnosed with ASDs in evading the feelings of isolation, loneliness, and frustration that often result from difficulties in communication. Much of the focus of intervention for children with ASD has revolved around social and communication deficits. However, with the exciting early motor development research related to such deficits, new possibilities and ways to intervene with young children are arising. That is not to say that focus should not remain on social/communication challenges, but rather to begin to also include motor challenges in the realm of early intervention. There are many forms of treatment and intervention for children with ASDs, and one child may respond differently to any given intervention. Though not intended to be a “cure-all” that will work for all children diagnosed with ASDs, dance/movement therapy provides another option that can be included in the continually expanding domain of early intervention.

Many in the field of DMT have worked with children with ASDs for many years. However, much of the momentum around ASD interventions is heavily reliant upon whether the intervention can be identified as evidenced-based. Research that aims to provide clearer effects of DMT interventions continues to be performed. As seen above, many dance-movement therapists (see Erfer, 1995; Tortora, 2006; Devereaux, 2012) have provided, and continue to provide, intervention ideas, methods, and techniques for working with children with ASDs. It is the hope that this theoretical framework can serve as a jumping-off point for further research into DMT as an early intervention for children with ASDs.

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