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Creative Therapies for Autism: Movement, music, and sandplay

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Abstract

Inaccessible social infrastructures present a variety of challenges to the autism community. These infrastructures are trademarked by speech, behaviors, and attitudes deemed desirable and acceptable by society, and because of these unwritten social guidelines, autistic individuals often feel burdened to conform and socialize in a certain way during social interactions. Autism is characterized by multisystem impairments and deficits in social communication and interaction, and restricted, repetitive patterns of behavior, interests, or activities. People with autism are often bullied or judged due to the general population's view of their behavior, which tends to deviate from social cues, leading to isolation, anxiety, depression, and low self-esteem.

Assisted Behavioral Therapy (ABA) has been the gold standard for treatment to aid in the development of social skills, but this method often involves training autistic individuals to mask their natural behaviors, which can be extremely harmful. Creative movement therapies (CMTs), *Voices Together* (*VT*) music therapy, and sandplay are three creative therapies explored in this paper, all of which involve loosely structured activities that promote intuitive self-expression through different artistic mediums. Creative expression has the potential to aid in acquiring or developing social communication and interaction skills, motor abilities, and self-esteem, providing basis for the development of verbal and nonverbal assertions, growth in social-emotional reciprocity, and developing, maintaining, and understanding relationships. Growth in self-esteem might allow for the enhancement of interpersonal skills and spontaneous, instinctual expressions. More research with larger, more diverse samples must be conducted. In this paper, person-first language and identity-first language are both used, as preference towards these labels varies among the autism community.

Areas of creative therapy can include music, dance, art, imaginary play, yoga, or martial arts, to name a few. Movement therapies are rooted in the Dynamical Systems Theory (DST) and the Shared Affective Motion Experience (SAME) theory. The DST holds that the foundation for higher-order cognitive skills and social communication is developed through the basic-perception action cycles sustained through bodily movement (Amonkar, Bhat, Srinivasan, and Su, 2021, p. 2). There is a certain instinctiveness that comes with social interaction, where the words and phrases used are constructed on a moment-to-moment basis, and non-verbal gestures are paired with these communications in a similar way. In movement therapy, actions in dance, martial arts, and yoga are carried out through personal agency, and adjustments are made successively to achieve a coherent, connected pattern of movement, similarly to how one might modify their verbal and nonverbal contentions in a social setting to fit the dynamic of the interaction. The DST also "must be conceptualized as the 'multiple, mutual, and continuous interaction of all the levels of the developing system, from the molecular to the cultural'" (Thelen and Smith, 2006, p. 258, as cited in Chacko et al., 2018, p. 2). This perspective speaks to the grounds behind the exclusion of and judgment cast on autistic individuals. This aspect of the DST highlights how a variety of different systems and people interact and grow in a symbiosis that gradually contributes to developmental cultural norms. Autism alters the "typical" engagement of motor and cognitive systems, making it difficult for those with autism to fit into a collective cultural model of sociability.

The SAME theory discusses how movement and music-related experiences engage multiple modalities, like thinking, hearing, seeing, moving, and more, and require the activations of "similar 'mirror' networks in the brain of participants, thereby forming the basis for social, emotional, and motoric connectedness between them" (Amonkar, Bhat, Srinivasan, and Su, 2021, p. 3). The

"mirror networks" reference the mirror neuron system (MNS), which includes cells that reflect or "mirror" others' behavior. The MNS is crucial for language development and use, theory of mind, empathy, and social cognition and communication (Mohandas and Rajmohan, 2007, p. 66). MNS neurons function to understand action, in that when somebody watches someone perform a certain action, these neurons activate in response. Mohandas and Rajmohan (2007) also indicated that, "a recent study… demonstrated the lack of MNS activity during observation and emotional expression in children with ASD" (p. 67). Learning and performing the movements from movement therapy elicits activity in the MNS, prompting the developmental connection between the social, emotional, and motoric brain regions. A participant watching the teacher perform a movement, demonstrating that movement themselves, and then receiving positive reinforcement afterward with a big smile and words of encouragement, would be an example of a therapeutic pattern that engages the MNS and prompts future implications for MNS activity during social situations.

Musical activity-related creative therapies have shown increasing evidence for their support of neuroplasticity (Münte et al., 2002; Pantev and Herholz, 2011, as cited in Fachner, O'Kelly, and Tervaniemi, 2016, p. 1). Neuroimaging techniques have allowed the examination of the effects of music on the brain's development, and have shed light on music's ability to influence the processing between the areas responsible for speech, attention, memory, and motor activity and modulate the metabolism of neurotransmitters and brain activity involved in social affiliation, stress, reward, and immunity (Schlaug et al., 2009; Besson et al., 2011; Patel, 2011, as cited in Fachner, O'Kelly, and Tervaniemi, 2016, p. 1). Moreover, musical activity may promote heightened responsiveness and communication during social experiences and facilitate coping for individuals with ASD and another co-existing mood disorder such as depression or anxiety (Paul et. al., 2015, p. 1).

Creative movement therapy (CMT) is an umbrella term for approaches that utilize artistic mediums like yoga, dance, martial arts, music, and theater. Some CMTs have shown promise in aiding motoric abilities, a system that is impaired from about 35 percent to upwards of 85 percent of autistic people; associations have been noted in multiple studies between motor deficits and more severe core autism impairments in cognitive domains, social communication, and repetitive behaviors (Amonkar, Bhat, Su, and Srinivasan, 2021, p. 6). Motor impairments can also lead to struggles with writing, dexterity, gait, posture, visuomotor control, and socially rooted motor skills like synchronizing movements with others, imitation, and praxis. As many studies involving creative therapies have small sample sizes due to this being a relatively new field of study, a systematic review of 72 studies with an overall sample size of 1,939 people, between the ages 3 and 65, was conducted in 2021 to assess the effectiveness of a wide range of CMTs. The studies assessed individuals with ASD, and some had coexisting diagnoses of other intellectual or learning disabilities or mood disorders. The studies were carried out in groups and individually and in total were 69 percent male. The review examined 25 music therapy-based interventions, 11 yoga approaches, 16 martial arts programs, 12 theater-based studies, 7 dance approaches, and 1 study that used both music and dance therapies. It was determined that the strongest evidence resulted from music and martial arts-related studies, followed by yoga and theater.[1] In reference to row "music" and column "social communication," 35 percent of the 25 music studies reported improvements in social communication skills and 38 percent of those studies reported behavioral-affective improvements after intervention. These results are likely informed by the rhythmic, melodic, and harmonic components of these activities which require spontaneous involvement, listening, singing, and moving to the beat; these kinds of behaviors call forth the practice of taking turns, imitation, verbal communication, and joint attention (Amonkar, Bhat, Srinivasan, and Su, 2021, p. 5); furthermore, motoric improvements are facilitated through cognitive and movement systems used during challenging, fine, precise, and continuous actions involved in instrument use. Fifty-six percent of the martial arts approaches reported improvements in social communication, motor domains, and executive functioning. Executive functioning outcomes are not surprising due to the rigorous structure of the art, in which motor planning, working memory, task switching, and focused attention are all necessary to perform the combined action progressions. Additional martial arts benefits include providing a functional alternative for repetitious behaviors and enhanced synthesis of neurotransmitters oxytocin, serotonin, and

[1] See Figure I: Studies that Targeted Certain Domains and Studies.

dopamine, where imbalance here is thought to be the basis of the social dysfunction in autism (Amonkar, Bhat, Srinivasan, and Su, 2021, p. 5).

Deficits in social communication skills are also addressed through a music therapy model formed by *Voices Together* (VT), a non-profit organization that provides programs for special education classrooms with clear goals in a low-stress setting. They employ VOICSS, *Vocal Interactive Communication and Social Strategies*, in which evidence-based interactive songs are used to teach social-emotional communication skills and speech. The program was carried out 45 minutes per week over 16 weeks, and participants would practice one song each session. The group would sit in a semi-circle and collectively select a "speaker" who would announce and begin the song. This gives that student a chance to take lead with their abilities in a group, vacillating between peer-peer interactions and peer-therapist interactions. The instructor, a trained music therapist with prior experience working with autistic children, would use responsive prompting to encourage verbal contributions from participants in a group setting. Responsive prompting is a useful tool to bring about independent, spontaneous speech from individual students within a group. The therapist would also use positive reinforcement to intentionally inform the maintenance of a prosocial behavior from that individual and inspire similar contributions from the rest of the group.

The program facilitated self-awareness, decision-making and problem-solving skills, and the analysis of emotional states within and outside of themselves. This routinized curriculum also required students to take up basic social rules like listening, greeting, gaining attention, and turn taking (Dawson, DeMoss, and Schmid, 2020, p. 3). Researchers used the DUACS as a relatively quick, generalizable, and simple way to evaluate the social communication results and how VT might have led to more improvements in this domain. Researchers created a range of behavioral prompts that addressed social-emotional adjustment and communication, some integral factors of the therapy program (Dawson, DeMoss, and Schmid, 2020, p. 3). Raters coded the responses from 0 to 3, 0 indicating an incomplete response and 3 designating complete and appropriate responses. Pre- and post-intervention, teachers used the Pervasive Developmental Disorder Behavior Inventory (PDDBI) which evaluates intervention responsiveness in terms of attention, communication, aggression, and anxiety. More specifically, the inventory aimed to distinguish maladaptive and adaptive behaviors. Teachers also rated the spoken language level of the students from preverbal communication to complex language before and after intervention.[2] From standard deviations and sum score means residing in the above table, it was deduced that the students varied in terms of their baseline communication and socialization abilities. The positive correlation between the slope and the intercept of DUACS scores also indicated that those with a higher DUACS scores pre-intervention demonstrated more significant improvement in the DUACS over the treatment period.[3] The empathy behaviors score proved to be statistically significant, meaning that higher baseline empathy scores positively correlated with higher DUACS scores. There was an interaction between social pragmatic issues scores and time, meaning that students scoring at higher levels for social pragmatic issues had lower DUACS scores. A significant relationship was found between beginning language level and time, indicating that higher baseline spoken language skills were also correlated with higher DUACS scores post-treatment. These findings demonstrate that VT shows evidence of being a useful therapeutic tool for improvements in communication, social-emotional learning, and language for autistic individuals with "moderate baseline social communication skills" (Dawson, DeMoss, and Schmid, 2020, p. 5).

Another study in Montreal, Canada analyzed sandplay and its ability to stimulate symbolic and creative play, social interaction, and communication among 25 elementary school-aged children that met autism and pervasive developmental disorder (PDD) criteria. The program was implemented in classrooms for 60-minute periods, and included an opening ritual, sandplay time, storytelling sharing, and closing ritual. The program was implemented over ten weeks by two art therapists and a psychologist across four different special needs

[2] See Table II: Descriptive Statistics of DUACS Scores and Other Outcome/Dependent Variables that Showed Improvements.

[3] See Table III: Prediction of DUACS Scores through Multilevel models.

classrooms. This program structure provided students with a clear beginning and end as well as predictable experience that still allowed them the freedom to play with their imagination and agency to let their creativity direct the session outcomes (Lacroix, Lu, Petersen, and Rousseau, 2010, p. 56). The opening ritual consisted of five to ten minutes of creative play including egg shakers and ribbons, imitating animals, tastes, or feeling, collective storytelling, and imaginary play, and functioned to encourage contributions through mirroring (Lacroix, Lu, Petersen, and Rousseau, 2010, p. 56). The sandplay period was based on the floortime model, where a teacher plays more of an observant, passive role to open and close communication and allow the creations made to be based in self-initiation and idea expansion from the child (Lacroix, Lu, Petersen, and Rousseau, 2010, p. 57). Figurines and other objects were provided to the students to encourage sharing, prompt scenery creation formed through creative inspiration, and build on and be inspired by each other's creations. Textured objects like water, feathers, and marbles provide a tactile medium for sensory-engagement and function to attract and maintain the focus of the children (Lacroix, Lu, Petersen, and Rousseau, 2010, p. 57). The storytelling period that followed was an opportunity for students to share their creations with their peers or the therapist. This program piece allowed students to develop confidence in their work and their ability to share it with others. During the closing ritual, students would mimic the beginning, climax, and end of a rainstorm by verbalizing, stomping, snapping, or clapping. This portion of the program was also "child-directed" and "promoted self-esteem, group awareness, and the creative and emotional investment that enhanced its appeal for the children" (Lacroix, Lu, Petersen, and Rousseau, 2010, p. 58).

Greenspan's symbolic developmental levels of play, receptive and expressive communication, symbolic expression, and social interaction were used to qualitatively assess the children's behavior through their sandplay creations, storytelling abilities, and opening and closing ritual behaviors (Lacroix, Lu, Petersen, and Rousseau, 2010, p. 59). The teachers of the classes used as participants in the study also filled out a questionnaire regarding their program expectations based on the children's symbolic capacity before intervention. General findings reported were high enthusiasm and excitement from the students during activities, no negative or declining results like poor concentration, possible complexification of symbolic play during storytelling and sandplay, attentional and participatory improvements, and heightened awareness of peers in terms of mirroring figurine use (Lacroix, Lu, Petersen, and Rousseau, 2010, p. 58). Researchers found that the greatest number of students demonstrated emerging symbolic, ritualistic, and rigid play ($n = 6$), symbolic representation and the beginning of storytelling ($n = 7$), and symbolic themes organized into story form ($n = 5$). The rest exemplified non-verbal tactile and sensorial exploration and pre-symbolic expression ($n = 3$) and pre-symbolic/functional play ($n = 4$) (Lacroix, Lu, Petersen, and Rousseau, 2010, p. 59). Generally, the students' increased involvement and excitement over the 10-week period enhanced and supported developments in communication, symbolic elaboration, and socialization (Lacroix, Lu, Petersen, and Rousseau, 2010, p. 60).

Creative therapies provide the opportunity for individuals to engage with a wide variety of artistic mediums in flexibly structured, engaging programs. These activities do not aim to change natural behaviors, but instead target confidence and creative agency in individuals so that they can act freely and build self-esteem in their verbal and nonverbal contributions. One of the gold-standard therapies, ABA, is a highly structured, intensive form of intervention that uses operant conditioning. It has been reported by members of the autism community as stressful, harmful, overstimulating, and "irresponsible [in] understanding the autistic brain" (Sandoval-Norton and Shkedy, 2019, as cited in Autistic Science Person). Even simply searching ABA on twitter, though quite informal, surfaces innumerable threads about traumatic experiences autistic people personally report having with ABA. This does not mean that people with autism cannot gain any benefits from ABA; it might be wonderful for some. But for those who find it damaging, creative therapies serve as a reasonable alternative. One of the many advantages of creative therapies is that it might be compounding on a specific interest that an autistic person already has or might spark the development of a new hobby that could be a long-term reinforcer of self-esteem. Being able to express oneself in this manner might also reduce the likelihood of a person with ASD developing anxiety or depression. Creative therapies have been rated as fun and enjoyable by the autistic population, which might increase their motivation and desire to stay in therapy, thereby increasing retention. Creative activities

are also ones that can be taken up easily at home, outside of therapy, without the help of a professional, and are smoothly modifiable for different ages, abilities, and interests. There are, however, still some drawbacks. Many studies have relatively low sample sizes and assess predominantly male and white populations, so there is no way to assess how these results–however promising they may be–could be generalized to non-white/non-male populations. Many creative therapy studies also do not use randomized control trials (RCTs), increasing the risk of bias and the need for randomized assignment of participants to groups (Amonkar, Bhat, Srinivasan, and Su, 2021, p. 10). Many studies in this field also do not clearly report the severity of symptoms of the autistic participants, making it difficult to deduce whether the results found will apply to the diverse presentations of autism and those with autism and another co-existing condition. Researchers also speculate that creative therapy improvements might not necessarily transfer into improvements in real-world social situations, so it is important that the next wave of research aims to target participation and function and not just the impairments that arise from autism (Amonkar, Bhat, Srinivasan, and Su, 2021, p. 2). It is also important to note that therapy for autistic people only exists because the world we live in is not structured in a way that considers their personal needs. It should not solely fall on autistic people to work towards functioning alongside neurotypical people. The general population must absolutely consider communicative adaptability to meet autistic people where they are at, just like others meet us where we are at when we might need a little extra support. Nonetheless, therapies are helpful for autistic individuals because most of the general population cannot achieve this mindset and remain close-minded and inhibited by a neurotypical perspective.

Overall, creative therapies deserve more attention and high-quality research to minimize concerns and provide more supporting evidence. These non-traditional therapeutic avenues acknowledge the breadth of diversity in human thought and assertions that are made as a result and provide opportunities for autistic individuals to develop faith in their creations and the persona behind them. The structured, but flexible expression setting gives rise to their belief in themselves and their contributions to the world. There is no one "correct" way to be creative; art is beautiful because it is all so different, and this is a perspective that we as humans must further acknowledge to understand, appreciate, and respect our diverse attributes.

Appendix

Figure I: Studies that Targeted Certain Domains and Studies that Showed Improvements

CMT approach	Social communication (*N* = 47)	Behavior (*N* = 21)	Affective (*N* = 20)	Sensory (*N* = 3)	Motor (*N* = 15)	Cognitive (*N* = 6)	Functional participation (*N* = 3)	Other domains (*N* = 16)
Music	20 (7)	5 (2)	5 (1)	1 (1)	5 (1)	0 (0)	1 (0)	5 (2)
Yoga	4 (1)	4 (3)	3 (0)	0 (0)	4 (2)	2 (2)	1 (0)	4 (1)
Martial arts	7 (4)	3 (1)	0 (0)	0 (0)	4 (2)	4 (2)	0 (0)	2 (0)
Theater	12 (3)	6 (1)	8 (1)	1 (0)	0 (0)	0 (0)	0 (0)	5 (3)
Dance and combined approaches	4 (0)	3 (0)	4 (0)	1 (0)	2 (0)	0 (0)	1 (0)	0 (0)

Number mentioned outside parenthesis indicates number of studies that assessed outcomes related to specific domains and number within parenthesis indicates the number of studies that showed improvements in specific outcomes based on our ES calculations.

Figure II: Descriptive Statistics of DUACS Scores and Other Outcome/Dependent Variables that Showed Improvements

	Baseline 1		Baseline 2		Baseline 3		Treatment 1		Treatment 2		Treatment 3	
Item	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Outcome/dependent variable												
DUACS	23.30	12.17	29.37	16.33	31.05	16.56	24.42	18.07	32.70	16.79	32.96	16.36
Time invariant predictor (Model 2)												
Gender[a]	0.80	0.40										
Language level	3.02	1.19										
Grade	2.58	1.36										
Age	8.04	1.62										
Time variant predictor (Model 3)												
Elang	13.33	11.56									16.07	13.77
Express	52.08	24.87									55.30	27.61
Socpp	14.02	8.67									11.97	7.82
Socaware	5.59	3.84									4.80	3.72
Empathy	5.27	4.40									5.88	4.52
Aslearn	9.71	3.19									10.75	2.88
Pragtalk	2.39	3.40									3.00	3.87

Note. Elang = expressive language competence; Express = expressive language; Socpp = social pragmatic problems; Socaware = social awareness problems; Empathy = empathy behaviors; Aslearn = associative learning skills; Pragtalk = pragmatic conversational skills; DUACS = Duke University Autism Communication and Socialization.

a 1 = Male.

Figure III: Prediction of DUACS Scores through Multilevel models.

	Model 1			Model 2			Model 3		
Variable	***b***	***SE***	***t***	***b***	***SE***	***t***	***b***	***SE***	***t***
Intercept	22.44	2.07	10.82*	27.32	16.84	1.62	−27.99	16.52	1.69
Time	1.52	0.23	6.47*	1.60	0.27	5.76*	1.72	0.21	7.99*
Language level				10.72	0.89	11.95*	11.73	1.12	10.44*
Age				3.30	2.84	1.16	3.50	2.54	1.38
Grade				−2.62	3.01	0.87	−3.81	2.72	1.40
Sex				−3.08	2.38	1.29	−2.25	2.14	1.05
Elang							0.17	0.15	1.15
Express							−0.09	0.11	0.79
Socpp							0.02	0.14	0.15
Socaware							−0.22	0.26	0.85
Empathy							0.45	0.15	2.97*
Aslearn							−0.14	0.17	0.86
Pragtalk							−0.02	0.22	−0.08

Note. 1 = male; Elang = expressive language competence; Express = expressive language; Socpp = social pragmatic problems; Socaware = social awareness problems; Empathy = empathy behaviors; Aslearn = associative learning skills; Pragtalk = pragmatic conversational skills.

* $p < .05$.

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