From Theory to Practice: Exploring Practical and Cost-Effective Therapies for Autism in Institutions

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Abstract

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by persistent challenges in social interaction, communication, and restrictive or repetitive behaviors. The prevalence of ASD has been steadily increasing worldwide. As of June 2023, the CDC reports that 1/36 children in the United States are designated with ASD, much greater than the 1/44 statistic from 2019. Furthermore, according to recent data from Autism Speaks, 31% of children with ASD have an intellectual disability (intelligence quotient [IQ] <70), 25% are in the borderline range (IQ 71–85), and 44% have IQ scores in the average to above average range (i.e., IQ >85) (Autism Statistics and Facts). Consequently, there is a growing need for effective and accessible therapies that must be implemented in school settings to support individuals with autism and provide them with equitable opportunities.

This paper aims to provide a comprehensive resource for schools and other institutions, exploring practical and cost-effective therapies for autism. The goal is to bridge the gap between theory and practice by highlighting popular therapies that have shown promising results in improving the behavioral outcomes of individuals with autism. Schools can gain the necessary knowledge and tools to make informed implementation decisions by examining the various therapeutic approaches colligated in this paper. This work aims to empower educators, administrators, and practitioners with the necessary knowledge and evidence to make informed decisions regarding the holistic development and well-being of individuals with autism.
This paper will delve into five main therapies successfully employed in school settings, focusing on their feasibility, affordability, and ease of implementation. The 5 therapies include **1) art therapy, 2) music therapy, 3) peer-intervention programs, 4) computer-based interventions, and 5) applied behavior analysis.** Furthermore, the paper will also provide a template method or plan for implementing these therapies, offering a practical framework for schools and institutions to effectively integrate these interventions into their existing programs and support structures.
The empirical outcomes and improvements observed in individuals who have received these interventions in lab research will be examined to provide positive evidence that may be extrapolated to institutional settings.

Limitations of the Current Universal Design for Learning (UDL) System

The Universal Design for Learning (UDL) framework has been widely adopted across schools to promote inclusive education and address the diverse needs of students. UDL aims to provide multiple means of representation, expression, and engagement (Rose & Meyer, 2002); however, for individuals with autism, who may experience challenges in expressing themselves verbally, the emphasis on verbal communication in a school environment often falls short in meeting the unique needs of students on the nonverbal area of the spectrum. Students that find it difficult to articulate their thoughts, emotions, and experiences can thus not express and healthily deconstruct internal emotions, often leading to frustration and limited comprehension of academics (Alter-Muri, 2017). Moreover, individuals with ASD that lack access to accommodative therapies in their institution often experience a certain alienation or ostracization

from their school and peers. This detachment leads to a pessimistic perception of their educational abilities (Landin & Schirmer, 2020). By providing appropriate therapeutic interventions, schools create an inclusive educational environment that fosters positive self-perception, social integration, and overall well-being for individuals with ASD.

I) Art Therapy

Art therapy harnesses the physical world to orchestrate the inner voice of individuals with ASD. This therapy is a highly cost-effective and easy-to-implement approach for individuals with autism within the context of schools and other institutions. For example, an institution can implement art programs for special needs students or even host monthly events using readily available and inexpensive materials such as paper, paints, and drawing tools, opening doors for schools with limited resources. In addition, although the expertise of a qualified art therapist can certainly enhance the therapeutic process, teachers, staff members, and even fellow peers can also facilitate art-based activities with basic training, empathy, and patience.

Examples of art therapies include:

a) Reflective Drawing to Music. This involves coordinating auditory processing and fine motor skills by having the individual listen to music while holding a drawing medium and letting their emotional response to the music guide their hand (Bagley, 2022). Mullin (2014) also discusses how individuals with Autism express higher creativity due to distinct connections in the brain, so thus this activity assists in uncovering this sense.

b) Collage Making: Collage making involves assembling materials like paper, magazine cutouts, fabric, and found objects to create a visual composition. It allows individuals to explore textures, colors, and patterns, promoting sensory integration and creativity.

c) Sensory Art Exploration: This activity focuses on engaging the senses through art. Individuals can experiment with different art materials, such as finger painting, using textured brushes, or exploring tactile materials. It helps with sensory processing, fine motor skills, and sensory self-regulation.

d) Group Mural Creation: Group mural creation involves collaborating with peers to paint a large-scale mural on a shared canvas, quilt, or wall. It promotes social interaction, teamwork, and communication skills (Rogers, 2010), fostering a sense of belonging and cooperation.

e) Clay Modeling: Using clay or playdough to create sculptures allows individuals to explore tactile sensations and enhance fine motor skills. It encourages imagination, creativity, and self-expression by manipulating a three-dimensional medium.

f) Nature Art: Engaging in nature-inspired art activities, such as leaf printing, flower pressing, or creating art with natural materials like rocks and twigs, connects individuals with the natural environment. It encourages observation skills, appreciation for nature, and a sense of calmness when combined with participating in the safe outdoors.

g) Storytelling through Illustration: Individuals can illustrate stories or narratives using their preferred medium, whether through cartoons, paintings, or written works. This activity combines creativity, visual storytelling, and communication skills, fostering imagination and narrative development.

h) Photography: Providing students with small handheld cameras allows individuals with autism to explore their environment, express themselves visually, and develop their perspective-taking skills. By capturing images of their surroundings, individuals can

convey their unique viewpoints and share their experiences with others through photo books or other compiling mediums.

It is crucial to recognize the inherent variability in the skills level of students with ASD, necessitating the need for simplistic approaches when designing craft projects, ensuring that the unique abilities and challenges of neurodivergent students are respected and that their participation in group settings remains inclusive and supportive (Henley, 1992). By tailoring craft projects to meet individual needs, educators and practitioners can create an environment that safeguards the privacy and dignity of students on the spectrum while fostering their engagement and sense of belonging within a larger social context.

Displaying these artworks in school showcases fosters a sense of pride in the artist. By acknowledging the student's achievements and skills and providing them with a platform to share their unique perspectives with the world, the institution can validate their experiences and enhance their self-esteem and self-confidence (Alter-Muri & Simone, 2017). Moreover, displaying the artworks of all students in school settings fosters a connection between neurodivergent and typical minds. Erasing the line that once divided these groups based on skill by leveraging the universal medium of creativity establishes an uplifting and welcoming environment for students.

II) Music Therapy

Music therapy offers a harmonious avenue for therapeutic intervention in individuals with ASD. As the Cleveland Clinic details, music therapy may involve listening to music, composing, singing (commonly in a call-and-response fashion), and playing instruments (What Is Music Therapy, 2023). Prior musical skill is optional to engage in this therapy, as the goal is to provide a means of self-expression, not to achieve perfection. The beauty of music therapy lies in its versatility and adaptability, allowing it to be implemented in various institutional settings and tailored to meet individual needs. Whether through structured music sessions led by trained music therapists or by simply incorporating music into the daily routines and curriculum, the transformative impact of music can be harnessed to enhance the lives of individuals with ASD.

Exploring Improvisational Music Therapy (IMT)

Improvisational Music Therapy (IMT) is a widely embraced and easily applicable aspect of musical interventions for individuals with ASD. This therapeutic approach involves a skilled musical instructor who engages with a single patient or a group of individuals with ASD, employing various musical instruments to develop essential musical skills like rhythm, syncopation, and the discernment of different timbres and pitches (Crawford et al., 2017). Moreover, IMT provides an avenue for nurturing social skills through collaborative musical activities, such as call-and-response singing or mirroring, allowing participants to interact and communicate with each other actively through music.

Participants engaged in IMT have reported heightened self-confidence, reduced stress levels, and diminished social anxiety (Hillier et al., 2012). In addition, comprehensive investigations into singing-based therapies have revealed their potential to significantly reduce anxiety-related stimming behaviors and enhance concentration among individuals with ASD (Dieringer et al., 2017), offering a promising avenue to address anxiety and attention challenges commonly experienced in this population. Furthermore, when combined with mediums such as dance therapy, IMT ameliorated emotional and certain social disorders among individuals with ASD (Mateos-Moreno & Atencia-Doña, 2013). The interactive and inclusive nature of IMT fosters a

sense of connection and shared experience among individuals with ASD, paving the way for improved social interactions and emotional well-being within the therapeutic context. Hence, integrating music therapy as a therapeutic modality serves a dual purpose—cultivating cognitive harmony among neurodivergent individuals and enriching the experiences of neurotypical and neurodivergent minds. Through the musical medium, individuals are united, transcending the limitations of verbal language and fostering a shared language of expression and inclusion within the educational milieu.

III) Peer Intervention Programs

Peer Intervention programs are designed to enhance the sociometric status and foster a supportive social community for students with ASD through natural positive reinforcement and peer social support. The concept of peer intervention has its roots in research dating back to the 1970s, which observed increased social engagement in sleep-deprived and socially isolated monkeys when they interacted with younger monkeys displaying persistent social behaviors (Odom, 2019). In contemporary research involving individuals with ASD, modern techniques involve creating model environments in various settings, such as homes, hospitals, and schools, where children are guided through interactions using toys and the assistance of a child interventionist (Craig-Unkefer, 2015).

It is important to dispel a common misconception about peer intervention therapy in that it merely involves placing a child with ASD either in a mainstream classroom alongside neurotypical students or within a setting with other neurodivergent students with no further processes. However, it should be noted that merely placing students with ASD in proximity to their peers does not yield any observed cognitive or social benefits (Odom et al., 1999). Hence, the intervention aspect of therapy becomes crucial to facilitate meaningful improvements in behavior and social interactions.

By incorporating peer intervention programs, therapists aim to desensitize individuals with ASD to anxiety-causing situations or social contexts by deconditioning his/her heightened emotional response. Through carefully guided interactions with peers and positive reinforcement, therapists create a supportive and approachable environment, helping ASD individuals overcome their anxieties and build meaningful social connections, ultimately fostering improved emotional well-being and social skills.

Implementation of Intervention Therapies

In a research study by Craig-Unkefer (2015), the effectiveness of intervention therapy was assessed among preschoolers on the autism spectrum within a school gym and classroom setting, showcasing its practicality in institutional implementation. The therapy involved a 5-minute collaborative play-planning session between the child and a trained practitioner, followed by a 10-minute play session where the children engaged with toys and materials. The interventionist observed and offered support throughout this play session through verbal redirects and reflective statements. Subsequently, a review session allowed discussions between the interventionist and the children regarding their play experiences and interactions. The Craig-Unkefer study revealed notable improvements in language diversity and verbal characteristics among preschoolers, demonstrating a substantial 213% increase in the number of distinct words spoken during the therapy sessions. These results highlight the therapy's potential to enhance language development and communication skills for nonverbal or introverted children on the autism spectrum, as it provides a structured yet nurturing environment that encourages active engagement and communication. Tailoring the therapy to

individual needs offers a supportive platform for such children to express themselves and develop essential social and language skills within a safe and understanding context. Therefore, embracing the organic principles of Peer Intervention and its demonstrable capacity to elicit verbal expression in previously introverted individuals while concurrently alleviating social apprehensions in scholastic and communal contexts underscores the imperative for its institutional integration.

IV) Computer-Based Interventions (CBI)

Computer-based interventions (CBI) or Computer-Assisted Instruction (CAI) offer a promising avenue for addressing barriers to providing effective social and emotional skills instruction for individuals with ASD (Mueller, 2013). These interventions, exemplified by social skills training apps, virtual reality programs, communication apps, cognitive training games, and more, capitalize on technology's interactive and adaptable nature to engage individuals in targeted skill development. Benefits include tailoring instructional materials to cognitive functioning, fostering engagement through a context-free environment, and mitigating aversive reactions to academic demands. However, the potential for reduced opportunities for social interaction and computer-based stereotypies due to CBI also exists (Ramdoss et al., 2012).

CBI is often facilitated through dedicated device applications crafted to impart essential emotional behaviors and social skills akin to those acquired through traditional behavioral therapy. CBI assumes a dual role, complementing cognitive behavioral therapy (CBT) when employed synergistically or alternatively as an accessible standalone therapeutic approach. This versatility positions CBI as a valuable resource, particularly within educational contexts, where the presence of a dedicated behavioral therapist might be financially or logistically challenging to secure.

Efficacy of CBI

In a research study by Petrovska and Trajkovski (2019), the efficacy of CBI is explored through the lens of the web application "Ucime Emocii." This investigation delves into its impact on individuals with ASD, a cohort comprising 33 participants. The study scrutinizes the augmentation of their capacity to decipher nonverbal cues, focusing on the intricate emotional nuances embedded within facial expressions while simultaneously heightening their situational awareness. The application strategically immerses users in recurrent social scenarios, challenging them to navigate various visual stimuli, each encapsulating the essence of common emotions such as sadness, happiness, fear, and anger.

After a cumulative engagement spanning 12 hours with the Ucime Emocii interface, participants who underwent CBI, particularly in the "Picto" section featuring simplified cartoon facial emotions, showcased a remarkable 56% variance in their pre and post-intervention prowess in discerning social signals. This empirical revelation underscores the potency of consistent and modest engagement with the computer software, demonstrating a noteworthy enhancement in social aptitude among the participants.

Furthermore, the intrinsic affinity that individuals with ASD often display towards computers (Moore et al., 2005) is attributed to the predictable nature of digital interfaces, the embrace of repetition, and a heightened sense of control (Herskowitz, 2003). This natural inclination has been leveraged in similar studies, wherein a remarkable 90% proficiency in recognizing and contextually understanding facial emotions has been achieved through software analogous to the functional framework exemplified by "Ucime Emocii" (Moore et al., 2005).

The accessibility of these assistive technologies comes at a cost-efficient price range of $50 to $150 (Herskowitz, 2003), rendering them within the financial reach of most educational institutions, allowing the implementation of the therapy without imposing undue budget strain. Moreover, the software obviates the necessity for extensive educator training, facilitating rapid assimilation of the interface's mechanics. This, in turn, minimizes implementation barriers that come with training faculty, ensuring a seamless integration process. Furthermore, CBI may easily integrate into facets of the school's daily rhythm, be it classroom engagements, dedicated therapy sessions, or after-school programs, while remaining unobtrusive to established educational routines.

V) Applied Behavior Analysis (ABA)

The core principles of Applied Behavior Analysis (ABA) find their origins in the research conducted by psychologist B.F. Skinner during the 20th century. His work illuminated that favorable behaviors can be reinforced through consistent positive responses, while unfavorable behaviors can be discouraged through negative stimuli (Skinner, 1969). This foundational understanding paved the way for the development of ABA therapy for ASD, then known as "early and intensive behavioral intervention" (EIBI), pioneered by Ivar Lovaas (Lovaas et al., 1973). The EIBI approach encompasses a rigorous daily regimen of therapeutic exercises, wherein maladaptive behaviors are corrected or minimized, and desired learning behaviors are nurtured through positive verbal reinforcement (Fisher et al., 2016).

ABA implementation begins with a trained specialist conducting a Functional Behavior Assessment (FBA) to identify behavior-related issues. Behaviors commonly uncovered through FBAs encompass repetitive behaviors (stimming), aggression, hyper fixations, motor challenges, impulsivity, self-injury, social anxiety, and sleep disturbances (Didden et al., 1997; Dominick et al., 2007).

ABA proves valuable in educational settings, systematically addressing diverse behaviors in individuals with ASD through personalized strategies guided by FBA. This fosters a meaningful student-therapist connection, promoting effective communication and targeted support. Nonetheless, ABA demands specialized training if used in institutions, with ASD professionals obtaining credentials from the Behavior Analyst Certification Board (BACB), ensuring standardized competence evaluation (Fisher et al., 2016).

Outcomes of ABA

Studies that observe the efficacy of ABA in ASD patients tend to focus on the listed behaviors (Matson et al., 2012):

a) Communication deficits: Echoic prompting and constant prompt delay are effective techniques for improving communication skills, specifically in question answering for individuals with autism. Echoic prompting utilizes auditory modeling to encourage language imitation, facilitating the acquisition of desired verbal responses. Meanwhile, constant prompt delay introduces a deliberate pause between question presentation and response prompting, fostering independent thinking and reducing reliance on immediate cues (Ingvarsson & Hollobaugh, 2013). This combined approach helps bridge communication gaps and empowers individuals to engage more autonomously in interactive communication scenarios.

b) Social skills deficits: Social Stories™ combat social deficits in individuals with ASD by presenting contextualized social scenarios and then illustrating, through various mediums, the desired behavioral response. The adaptability of Social Stories™ is

underscored by their capacity to effectively integrate through various mediums, including therapist-led sessions, CBI, and auditory delivery methods (Karkhaneh et al., 2010). A study evaluating the impact of a Social Stories™ therapy course revealed a notable reduction in inappropriate communication, aggressive behavior, and inappropriate socialization among children with ASD (Romano, 2002). This underscores the potential of Social Stories™ as a tool for enhancing social skills and facilitating meaningful behavior changes within the ASD population.

c) Stereotypies/Stimming: Stereotypies/Stimming: A case study conducted by Luiselli et al (2004) illustrates the application of ABA in addressing repetitive behaviors, specifically saliva play, in a child with ASD. Through functional behavior analysis, the underlying factors driving the behavior were identified (oral fixations), with both automatic and escape-motivated reinforcement patterns recognized. The intervention involved tailored techniques like attention-directing and demand (providing the child with alternative teething objects and verbalizing negative feedback when saliva play occurred). ABA's ability to pinpoint triggers and reinforcement mechanisms proved effective in behavior reduction. This study highlights ABA's proficiency in analyzing intricate behaviors, devising targeted interventions, and ultimately alleviating stereotypies through evidence-based and individualized approaches.

d) Self-injurious behavior/Aggression: Aggression and tantrums are recurrently documented behaviors exhibited among children and adults with ASD (Im, 2021). A case study by Barnoy et al. (2009) delved into the manifestation of bruxism (teeth grinding) in a child with ASD. This behavior was observed to be maintained by automatic reinforcement. The study revealed that a comprehensive intervention approach encompassing diverse cues, including verbal and physical prompts (wherein the ABA therapist applied pressure on the child's chin while requesting her to vocalize "say ah,") yielded remarkable efficacy in mitigating the teeth-grinding behavior over time. This underscores the potential of Applied Behavior Analysis (ABA) 's potential in ameliorating specific behaviors like bruxism and self-injurious behaviors on a broader spectrum.

In conclusion, ABA presents a powerful and adaptable approach for diverse institutions, particularly within educational settings. Schools can leverage ABA's methodical strategies, as highlighted in the studies, to create a nurturing environment for individuals with ASD. Educators and therapists can significantly enhance behavioral outcomes and overall well-being by integrating these techniques. ABA stands as a reliable guide towards more inclusive and effective educational practices.

Evaluation of Therapies

With the escalating prevalence of ASD diagnoses within school-aged children in the United States, educational institutions are increasingly attuned to accommodating this growing demographic. A survey encompassing school staff members underscored common concerns for students with ASD, highlighting heightened occurrences of outbursts, constrained autonomy, diminished motivation, and heightened anxiety (Grandisson et al., 2019). Further insights from research spotlight the pedagogical challenges unique to students with ASD, encompassing hurdles like collaborative group work, transitioning attention, and manifestations of aggression in response to instructional endeavors (Lindsay et al., 2013). Additionally, studies illuminate issues encompassing behavior regulation, the marginalization of ASD within the academic community, and inadequacies in teacher training and resource allocation (Lindsay et al., 2013).

The Response to Intervention (RTI) model, elucidated by Grandisson et al. (2019), offers a comprehensive framework for integrating therapeutic approaches catering to neurodiverse students within educational contexts. This model delineates three tiers akin to a hierarchical "pyramid" structure. Tier 1, forming the foundation, employs inclusive instructional methodologies tailored to the diverse spectrum of students, irrespective of neurodivergence. Tier 2 introduces targeted interventions, often in small group settings, to address specific challenges, bridging the cognitive/performance gap between neurodivergent and neurotypical learners. Lastly, tier 3 provides intensely individualized care, including closely monitored one-on-one therapy sessions, meticulously tracking progress. Institutions are endowed with the discretion to determine the extent of support across these tiers, aiming to furnish equitable learning opportunities. In an ideal scenario, a comprehensive institution would have the capacity to offer resources spanning all three tiers, ensuring a truly inclusive educational environment.

Conclusion

The increasing prevalence of Autism Spectrum Disorder (ASD) in US schools has heightened the demand for effective interventions by institutions. Concerns raised by staff about issues such as outbursts and limited autonomy for ASD students (Grandisson et al., 2019) underscore the urgency. The Response to Intervention (RTI) model, outlined by Grandisson et al. (2019), provides a practical tiered framework that adapts to diverse needs, encompassing inclusive strategies (Tier 1), targeted interventions (Tier 2), and personalized care (Tier 3).

This study examines five key therapies—art therapy, music therapy, peer intervention programs, computer-based interventions, and applied behavior analysis. These approaches not only tackle the behavioral and developmental challenges of ASD but also offer cost-effective and feasible integration within schools.

Future research might delve into the long-term effects of these interventions, shedding light on their lasting impact as individuals transition through various stages of life. Could the insights gleaned from these therapies extend beyond the classroom, shaping academic success, broader social integration, and emotional well-being?

This paper equips educators, administrators, and practitioners with tools to create a genuinely inclusive educational environment by bridging theory with practice. As schools aim to provide effective ASD support, these insights offer a promising way forward, working with the belief that every individual, regardless of their neurodivergence, has a story worth telling, a voice worth hearing, and a world worth shaping.

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