Review Article

Art Interventions for Children With Autism Spectrum Disorder: A Scoping Review

Allison Bernier, Karen Ratcliff, Claudia Hilton, Patricia Fingerhut, Chi-Ying Li

Importance: Autism spectrum disorder (ASD) is a neurological condition characterized by impairments in social interaction, communication, and behavior. Occupational therapy practitioners use creative arts interventions for children with ASD, but relevant evidence for these interventions is lacking.

Objective: To provide occupational therapists evidence of the benefit of creative arts interventions for children with ASD by evaluating treatment efficacy and connecting the evidence with the *Occupational Therapy Practice Framework: Domain and Process* (4th ed.; *OTPF–4*).

Data Sources: We searched peer-reviewed articles in six databases: CINAHL, Cochrane, PubMed, Ovid, PsycInfo, and Scopus. Eighteen articles published between 2000 and 2020 met Level 1b or 2b evidence criteria and were retrieved for full review; 15 were included in this scoping review.

Study Selection and Data Collection: We used Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to extract data. Inclusion criteria were as follows: (1) Level 1b or 2b study; (2) quantitative data; (3) published in English; (4) population of children (ages <18 yr); (5) primary diagnosis of ASD; and (6) creative arts intervention in the forms of drawing, painting, or coloring; music; or theater.

Findings: Creative arts interventions benefited children with ASD in two *OTPF–4* areas (process and social interaction) pertaining to the Performance Skills domain and one *OTPF–4* area (body functions) pertaining to the Client Factors domain. We found similar effects for group and individual intervention sessions, and significant improvements required multiple sessions.

Conclusions and Relevance: Our findings provide evidence for the efficacy of creative arts interventions to enhance occupation-based outcomes for children with ASD.

What This Article Adds: Our findings support occupational therapy practitioners' use of creative arts interventions to improve *OTPF–4*-based client factors and process and social interaction skills for children with ASD.

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Autism spectrum disorder (ASD) is a neurological condition characterized by impairments in social interaction, communication, and behavior and restricted and repetitive patterns and interests (American Psychiatric Association, 2013). People with ASD often have fixed behaviors and sensory processing challenges, such as tactile defensiveness (Kern et al., 2006). Occupational therapy interventions help clients improve their sensory processing, behavior, and interaction skills (Case-Smith & Arbesman, 2008). Some common ASD interventions used by occupational therapists include sensory-based or behavioral interventions, social cognitive training, developmental skills interventions, interactive training, and parent-mediated approaches (Case-Smith & Arbesman, 2008).

The definition of *art* can be broad and encompass numerous different activities. Perruzza and Kinsella (2010) considered *creative arts occupations* as any arts-based activities that elicit creativity in a person. These can include painting, drawing, creative writing, music, and textile arts and crafts. We applied Perruzza and Kinsella's (2010) notion of creative arts occupations to define *art* in this study. We then considered whether the selected creative arts are commonly used by occupational therapists in practice and whether they have a potential positive impact on children with ASD.

Creative arts activities have been shown to have positive effects on the performance skills of children with ASD (Bharathi, Venugopal, & Vellingiri, 2019; Brancatisano et al., 2020; Corbett et al., 2011; Schweizer et al., 2019). For example, children with ASD often have trouble communicating and interacting with others. Drawing or painting allows them to express themselves and communicate in an indirect way with others (Schweizer et al., 2019). Although there is abundant research on the topic of art activities in interventions for ASD, so far no research has systematically examined how occupational therapists use different art interventions in treating children with ASD. Even though relevant evidence is lacking, occupational therapists are equipped to integrate sensory processing and behavioral skills by using art in therapy.

Creative arts interventions have been shown to be effective in targeting behavioral, social, and developmental deficits in children with ASD (Schweizer et al., 2019). Creative arts allow children with ASD to express themselves through different media and provide a safe space for them to communicate and develop their skills (Bharathi, Venugopal, & Vellingiri, 2019; Schweizer et al., 2019). Occupational therapists are well suited to use creative arts interventions in therapy with children with ASD (Case-Smith & Arbesman, 2008). Using different art materials can provide a wide range of sensory experiences (e.g., auditory, tactile; Bharathi, Jayaramayya, et al., 2019; Schweizer et al., 2019) and capture the status of depression and anxiety (Li et al., 2011). This unique feature of art activities can benefit people with sensory processing and emotional regulation challenges, which are common among children with ASD (Schweizer et al., 2019). For example, using picture creation and visual tangible aids can help children with ASD better integrate sensory and cognitive experiences and facilitate behavioral changes (Schweizer et al., 2019). However, whether art activities can improve occupation-based outcomes remains unclear, prompting the need to connect evidence with the use of creative arts interventions and occupational therapy for children with ASD.

The *Occupational Therapy Practice Framework: Domain and Process* (*OTPF–4;* American Occupational Therapy Association [AOTA], 2020) outlines the scope and domain of occupational therapy practice. This framework outlines specific aspects of the practice domain that interconnect to empower a person's identity, well-being, and participation. Occupational therapists use the *OTPF–4* as a foundation for selecting interventions that address specific aspects of the occupation-based domains to maximize clients' overall health. The *OTPF–4* domains are Occupations, Client Factors, Performance Skills, Performance Patterns, and Contexts (AOTA, 2020). It is important for occupational therapists to identify effective *OTPF–4*-based interventions that are tailored to clients' needs.

The two aims of this scoping review were to (1) explore specific *OTPF–4* domains that can be targeted through creative arts and (2) establish efficacy evidence of art interventions in the occupational therapy literature for children with ASD. One survey conducted in Sweden found that only 44% of occupational therapists used creative arts as interventions, and most of these interventions were designed for psychiatric health care (Müllersdorf & Ivarsson, 2012). This implies that although research has indicated that creative arts are an effective intervention for children with ASD (Bharathi, Venugopal, & Vellingiri, 2019; Brancatisano et al., 2020; Corbett et al., 2011; Schweizer et al., 2019), they are still not widely used for this population in occupational therapy practice. This review fills this gap in knowledge and sheds light on how to provide evidence-based creative arts interventions for children with ASD in occupational therapy. Our findings will allow occupational therapists to incorporate evidence-based art activities into their practice when working with children who have ASD to enhance effective occupation-based art interventions.

Method

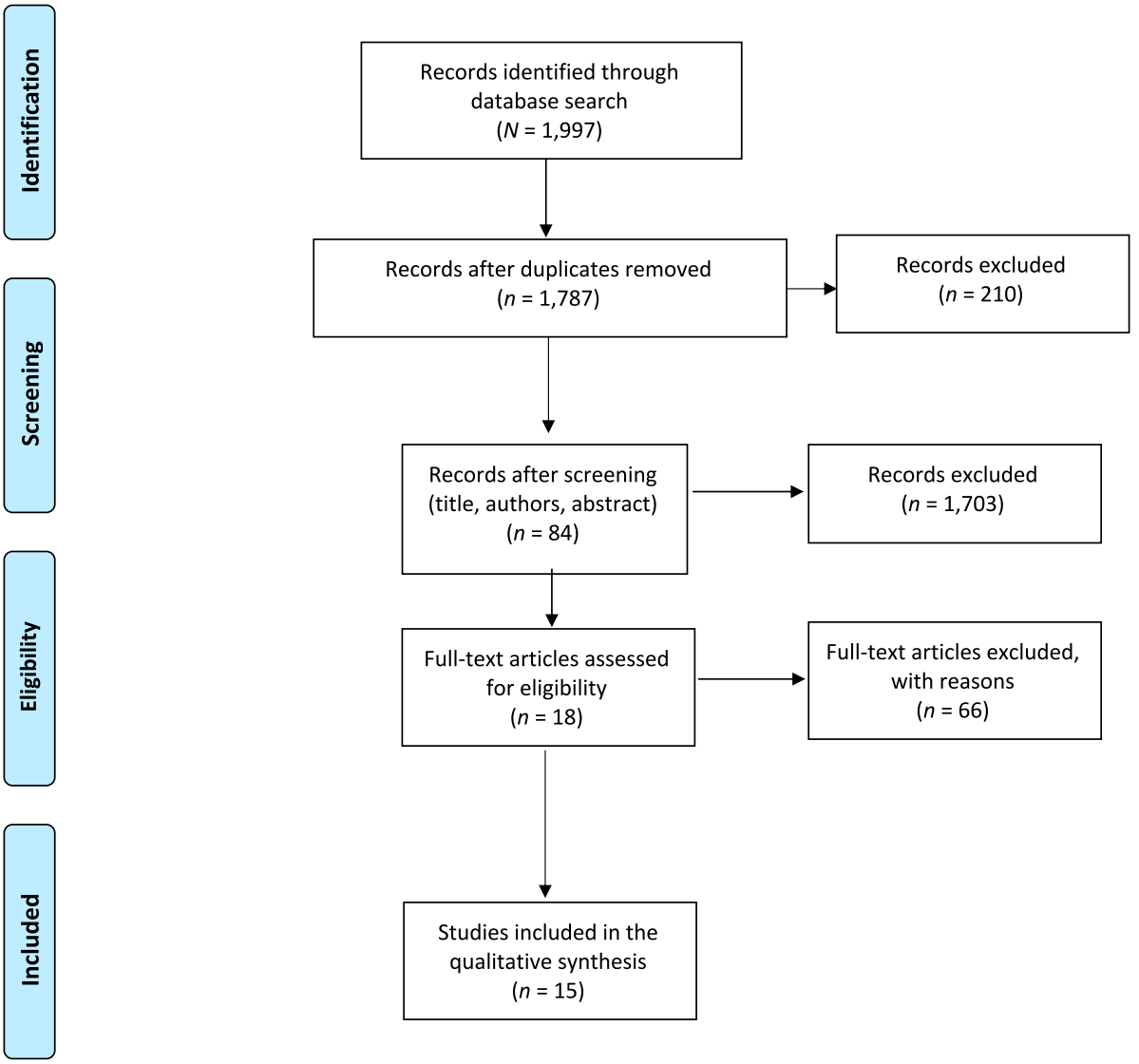
Databases

We followed Arksey and O'Malley (2005) and Levac et al.'s (2010) four steps to conduct this scoping review. We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher et al., 2009) procedure to document the literature selection process (Figure 1). We searched six databases—CINAHL, Cochrane, PubMed, Ovid, PsycInfo, and Scopus—using the following search terms: *art, painting, art therapy, drawing, creative arts therapy, color, music, theater, therapy, intervention, autism spectrum disorders, ASD,* and *autism*. These terms reflect Perruzza and Kinsella's (2010) definition of creative arts occupations. To ensure the process was thorough, a librarian who specializes in systematic reviews assisted us with the search, which identified 1,997 articles. After duplicates were removed, 1,787 articles were screened. Titles and abstracts of these 1,787 articles were reviewed for eligibility. A total of 18 full-text articles were screened for eligibility. Fifteen articles met the inclusion criteria and were included in this study.

Inclusion and Exclusion Criteria

We included only peer-reviewed research published from January 2000 to April 2020. The inclusion criteria were as follows: (1) Level 1b or 2b study; (2) quantitative data; (3) published in English; (4) population of children (ages <18 yr), based on the definition used by the United Nations Children's Fund (1995); (5) primary diagnosis of ASD; and (6) intervention in the form of general creative arts (including drawing,

Figure 1. Flow diagram of the study selection process.



Note. Figure format from "Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement," by D. Moher, A. Liberati, J. Tetzlaff, and D. G. Altman; PRISMA Group, 2009, *PLoS Medicine, 6*(6), e1000097. https://doi.org/10.1371/journal.pmed.1000097

coloring, painting, or making things with clay), music, and theater. We selected creative arts, music, and theater because they are commonly used by occupational therapists in practice and met our definition of creative arts (Perruzza & Kinsella, 2010). We also expected them to provide positive potential benefits that would address the predominant limitations commonly seen among children with ASD.

The five exclusion criteria were (1) population of nonchildren (ages ≥18 yr); (2) a primary diagnosis other than ASD; (3) combined interventions using art and other activities (i.e., interventions that included a modified diet along with art intervention were excluded); (4) interventions with multiple modalities that were expected to confound the effect of art interventions, including virtual reality, robots, auditory integration therapy, music-evoked rewards, or sound beam imitation; and (5) use of only qualitative outcome measures.

Occupational Therapy Practice Framework

We used the latest edition of the *OTPF*, the *OTPF–4* (AOTA, 2020). This edition is similar to the previous one; however, the *OTPF–4* modified domains to outline additional areas in which occupational therapists have knowledge and skills and the process that describes client-centered and occupation-based interventions. The *OTPF–4* is composed of five domains: (1) Occupations, (2) Contexts, (3) Performance Patterns, (4) Performance Skills, and (5) Client Factors. Each *OTPF–4* domain contains detailed subcategories.

Procedure

We used the OCEBM Levels of Evidence Working Group (2009) guidelines to determine the level of evidence for each screened article. We included only articles with a 1b or 2b level of evidence. Level 1b

evidence is defined as "well-designed individual randomized controlled trial (RCT)," in other words, not a pilot or feasibility study with a small sample, and Level 2b evidence is defined as "individual prospective cohort study, low-quality RCT (e.g., <80% follow-up or low number of participants; pilot and feasibility RCT studies), ecological studies and two-group, nonrandomized studies" (AOTA, 2022). To determine the risk of bias for each article, we used two assessment guidelines: (1) Higgins et al.'s (2019) chapter "Assessing Risk of Bias in a Randomized Trial" for low-quality RCT studies and (2) Study Quality Assessment Tools from the National Heart, Lung, and Blood Institute (2014) for pre–post studies that did not include a control group. In addition, we summarized the treatment intensity of each included study to provide transparency for the used art interventions. We also analyzed outcome measures of the included studies and linked the outcome measures with detailed and specific aspects of the *OTPF–4* domain descriptions. We then analyzed and synthesized the *OTPF–4* domains targeted through creative arts interventions.

Results

Overview of Study Characteristics

A summary of the characteristics of each study is provided in Table A.1 in the Supplemental Appendix, available online with this article at https://research.aota.org/ajot. A total of 1,171 participants were represented by the included studies, with individual sample sizes varying from 9 to 364. Participants' ages ranged from 3.5 yr to 16 yr. Four of 15 studies were conducted outside of the United States (Chincholkar et al., 2019; Crawford et al., 2017; Koo & Thomas, 2019; Poquérusse et al., 2018). Three used general creative arts (painting, drawing, and clay use) activity interventions (Chincholkar et al., 2019; Koo & Thomas, 2019; Richard et al., 2015), 8 used music interventions (Bharathi, Jayaramayya, et al., 2019; Bieleninik et al., 2017; Crawford et al., 2017; Gattino et al., 2011; LaGasse, 2014; Poquérusse et al., 2018; Sharda et al., 2018; Simpson et al., 2013), and 4 used theater interventions (Corbett et al., 2016, 2017, 2019; Ioannou et al., 2020). Individual treatment sessions ranged from 30 min to 4 hr. Intensity ranged from a single intervention session to three sessions a week over the course of 5 mo. The art interventions used, and the duration of each intervention, are outlined in Table A.2. We suggest that occupational therapists use Table A.2 as a guideline when designing and incorporating art interventions into their work with children with ASD to promote evidence-based practice.

Levels of Evidence

In accordance with established guidelines (U.S. Preventive Services Task Force, 2018), we examined the level of evidence for each study and identified 7 articles as Level 1b (Bieleninik et al., 2017; Corbett et al., 2017, 2019; Crawford et al., 2017; Ioannou et al., 2020; Sharda et al., 2018; Simpson et al., 2013) and 8 as Level 2b (Bharathi, Jayaramayya, et al., 2019; Chincholkar et al., 2019; Corbett et al., 2016; Gattino et al., 2011; Koo & Thomas, 2019; LaGasse, 2014; Poquérusse et al., 2018; Richard et al., 2015). Details of each study's design are provided in Table A.1.

Risk of Bias

Nine RCT studies had a moderate risk of bias (Bharathi, Jayaramayya, et al., 2019; Corbett et al., 2016, 2017, 2019; Ioannou et al., 2020; Koo & Thomas, 2019; LaGasse, 2014; Richard et al., 2015; Simpson et al., 2013). Five articles were determined to have a low risk of bias (Bieleninik et al., 2017; Crawford et al., 2017; Gattino et al., 2011; Poquérusse et al., 2018; Sharda et al., 2018). One article was a one-group pre–post study (Chincholkar et al., 2019), and we determined it to have a low risk of bias. Tables A.3 and A.4 provide detailed risk-of-bias information for each study.

Outcome Measures

Several outcome measures were used among the studies. Four studies used the Childhood Autism Rating Scale (CARS) or second version (CARS-2) (Bharathi, Jayaramayya, et al., 2019; Chincholkar et al., 2019; Gattino et al., 2011; Koo & Thomas, 2019), and 4 studies used the Peer Interaction Paradigm (Corbett et al., 2016, 2017, 2019; Ioannou et al., 2020). Two studies each used the Autism Diagnostic Observation Schedule (Bieleninik et al., 2017; Crawford et al., 2017), the Social Responsiveness Scale (SRS; Corbett et al., 2016; LaGasse, 2014), the Developmental NEuroPSYchological Assessment (NEPSY; Corbett et al., 2016, 2019), or the State–Trait Anxiety Inventory for Children (Corbett et al., 2017; Ioannou et al., 2020). Chincholkar et al. (2019) also used the Vineland Social Maturity Scale to measure social maturity and social behavior. Other measures used were the Diagnostic Analysis of Nonverbal Accuracy 2, the Child Facial Expressions subscale (DANVA 2–CF; Richard et al., 2015), the Children's Communication Checklist–2 (CCC–2; Sharda et al., 2018), the Beach Family Quality of Life Scale (FQoL; Sharda et al., 2018), the Vineland Adaptive Behavior Scales, Maladaptive Behavior subscale (Sharda et al., 2018), the Autism Treatment Evaluation Checklist (ATEC; LaGasse, 2014), the TRIAD Special Skills Assessment (Bharathi, Jayaramayya, et al., 2019), salivary α-amylase (Poquérusse et al., 2018), observation of engagement and problem behaviors (Simpson et al., 2013), the Adaptive Behavior Assessment System (Corbett et al., 2016), the PSI-SF and short version of the Warwick–Edinburgh Mental Well-Being Scale (Crawford et al., 2017), and the PPVT–2 (Sharda et al., 2018; see Table A.1).

Fourteen of 16 outcome measures had good reliability ($r > .80$) and construct validity (Ahmad & Warriner, 2001; Corbett et al., 2016, 2017; de Bildt

et al., 2005; Doll, 1936; Hoffman et al., 2006; Lord et al., 2000; Magiati et al., 2011; Norbury et al., 2004; Nowicki & Duke, 2008; Poquérusse et al., 2018; Ruble et al., 2008; Schopler et al., 1980; Simpson et al., 2013). The two outcome measures with lower reliability ($r < .80$) were the SRS and the DANVA 2–CF (Corbett et al., 2016). The SRS specifically had lower reliability for females ($r < .80$) but higher reliability for males ($r > .80$; Corbett et al., 2016; Nowicki & Duke, 2008). The CARS, CCC–2, FQol, and ATEC had shorter administration times, only 5 to 15 min (Hoffman et al., 2006; Magiati et al., 2011; Norbury et al., 2004; Schopler et al., 1980). The NEPSY took the longest to administer, 2 to 5 hr (Ahmad & Warriner, 2001).

Summary of Creative Arts Interventions for Children With Autism Spectrum Disorder

We categorized the creative arts interventions into three categories: (1) general activities ($n = 3$), (2) music ($n = 8$), and (3) theater ($n = 4$). In the sections that follow, we summarize the findings for each category.

General Activities

Three studies used general creative activities of drawing, painting, or coloring (Chincholkar et al., 2019; Koo & Thomas, 2019; Richard et al., 2015). Two studies used 30-min sessions, with 1 study consisting of eight 30-min sessions (Koo & Thomas, 2019) and the other consisting of 16 30-min sessions over 2 mo (Chincholkar et al., 2019). In both studies, each session allowed the child to choose their art material (draw, paint, clay, or craft) to work through basic art concepts and motor skills (Koo & Thomas, 2019; Chincholkar et al., 2019), which focuses on drama, risk taking, and problem-solving skills in children. The third study used an intervention that consisted of asking the child to use the facial features of a mouth, nose, eyes, and eyebrows to construct four different faces—happy, sad, angry, and fearful—in one 60-min session (Richard et al., 2015).

Two of the 3 studies observed a positive effect in children with ASD. Koo and Thomas (2019) found a notable increase in social reply consistency and level of intellectual response relating to others as measured with the CARS. Chincholkar et al. (2019) found considerable improvements in visual response, verbal communications, and social communication. However, Richard et al. (2015) found no statistically significant difference in the ability to recognize emotions from before to after the intervention for the control and intervention groups. None of the articles examined whether positive improvements lasted after intervention.

Music

Eight studies examined the effect of music interventions (Bharathi, Jayaramayya, et al., 2019; Bieleninik et al., 2017; Crawford et al., 2017; Gattino et al., 2011; LaGasse, 2014; Poquérusse et al., 2018; Sharda et al., 2018; Simpson et al., 2013).

Three studies used structured individual music interventions to address specific learning skills (Bieleninik et al., 2017; Crawford et al., 2017; Sharda et al., 2018). This type of intervention required one to three 30- to 45-min sessions per week for 2 to 5 mo. The sessions focused on singing or musical play to target attention, synchronizing (doing what the therapist is doing), mirroring (matching the therapist, in both music and body language), and grounding (organizing and steadying the music; Bieleninik et al., 2017); playing tuned or untuned percussion or wind instruments to target therapy session engagement and tolerance level to choose new or different musical instruments (Crawford et al., 2017); or using musical instruments, singing, or rhythmic cues to target communication, taking turns, integrating senses, and musical interaction (Sharda et al., 2018).

Three studies used less structured 1:1 interventions that required higher levels of improvisation (Bharathi, Jayaramayya, et al., 2019; Gattino et al., 2011; Poquérusse et al., 2018). These types of interventions involved singing, dancing, and playing with the musical instruments while listening to songs (Bharathi, Jayaramayya, et al., 2019); playing with the musical instruments and listening to music when a song was played on a CD player (Gattino et al., 2011); or peer interaction and discussion about the emotions felt when listening to different musical pieces (Poquérusse et al., 2018). One study allowed for the group to improvise a performance using the musical instruments (Poquérusse et al., 2018).

One study was conducted in small groups (LaGasse, 2014). These 50-min small-group sessions occurred twice a week for 5 wk. Sessions consisted of creating structured group musical experiences and encouraged participants to listen to and communicate with each other. The children were provided sensory experiences, such as sitting on therapy balls, jumping, running, stomping, or deep pressure, before and after the group music, and the sessions ended with cooperative play (LaGasse, 2014). Simpson et al. (2013) used music as a way to deliver instructions in the intervention and found that children with ASD engaged more in a labeling task if the instructions were sung rather than spoken.

All 8 of these studies found at least one positive effect of using music in interventions with children with ASD. These improvements were seen specifically in verbal communication (e.g., speech and semantics), engagement, social awareness, social relations (e.g., increasing family interactions), less parental stress, less child stress, more joint attention, improved eye gaze, better understanding and perspective taking, more responding to others, and improved ability to maintain social interactions and interests. Among these 8 studies, 1 found that only nonverbal communication

improved (Gattino et al., 2011) and that maladaptive behaviors, such as inappropriate initiations and ASD–like mannerisms, were reduced. Two studies found no significant difference in the initiation of postintervention communication compared with the control group (Bharathi, Jayaramayya, et al., 2019; LaGasse, 2014). One study found no difference in children's responses to communication, social withdrawal, ATEC speech and communication scores, sociability, and health and physical behavior before and after the intervention (LaGasse, 2014). Bharathi, Jayaramayya, et al. (2019) also found that the positive effect did not last in the posttest and follow-up periods. Simpson et al. (2013) found that singing had a notable effect on engagement but not on reducing challenging behaviors.

Theater

Four studies used theater interventions, specifically, the Social Emotional NeuroScience Endocrinology (SENSE) theater approach (Corbett et al., 2016, 2017, 2019; Ioannou et al., 2020). This intervention is delivered through 10 4-hr group sessions and incorporates peer support using learning theory behavioral strategies. It involves theater games, role playing, improvisation, character development, rehearsals, and the production of a play (Corbett et al., 2016, 2017, 2019; Ioannou et al., 2020). Three of the 4 studies also used video modeling, in which children were asked to watch 20 videos and practice target behaviors, including acting out songs and role plays for about 15 min a day (Corbett et al., 2016, 2017; Ioannou et al., 2020).

All 4 studies found positive effects of theater interventions in children with ASD. Specific improvements were seen in solicited group play, unsolicited group play, trait anxiety, social cognition, cortisol levels, social ability, communication symptoms, playing with toys with peers around, immediate memory of faces, delayed memory of faces, and Theory of Mind. A significant decrease in isolated play was also reported (Ioannou et al., 2020). One study found that improvements in communication lasted for 2 mo after the intervention (Corbett et al., 2016). Although 1 study found improvements in unsolicited group play (Ioannou et al., 2020), another observed no difference (Corbett et al., 2019). One study found no difference in unsolicited self-play (Ioannou et al., 2020). Two studies found no change in state anxiety levels (Corbett et al., 2017; Ioannou et al., 2020). *State anxiety* is defined as a temporary reaction to an event, whereas *trait anxiety* is defined as a more stable personality feature (Saviola et al., 2020).

Connecting Effectiveness of Art Interventions With the *OTPF–4*

All studies targeted at least one aspect of the *OTPF–4* domains (Table A.5). Fourteen of the 15 used interventions that targeted aspects of the Performance Skills domain. Twelve of those 14 studies targeted *OTPF–4* social interaction skills (Bharathi, Jayaramayya, et al., 2019; Bieleninik et al., 2017; Chincholkar et al., 2019; Corbett et al., 2016, 2019; Crawford et al., 2017; Gattino et al., 2011; Ioannou et al., 2020; Koo & Thomas, 2019; LaGasse, 2014; Richard et al., 2015; Sharda et al., 2018). Two of the 14 focused on process skills, which are part of the Performance Skills domain (LaGasse, 2014; Simpson et al., 2013). Seven studies targeted Client Factors, specifically, body functions. Among these 7, 3 targeted the body function of specific mental functions, such as higher level cognitive processes; attention; and emotional and global mental functions, such as temperament and personality (Bieleninik et al., 2017; Corbett et al., 2019; Sharda et al., 2018). The remaining 4 studies targeted specific emotional functions, as part of mental functions of the body functions category (Corbett et al., 2017; Crawford et al., 2017; Ioannou et al., 2020; Poquérusse et al., 2018).

Discussion

The purpose of this scoping review was to identify specific *OTPF–4* domains in which creative arts interventions can be effectively used by occupational therapists to help children with ASD. On the basis of evidence from 15 selected articles, we found that the evidence from 13 supports the efficacy of drawing and painting, music, and theater for children with ASD. Evidence supports the idea that creative arts activities specifically target the *OTPF–4* Performance Skills and Client Factors domains. These creative arts interventions appear to have a similar impact on outcomes regardless of whether they are delivered to a group or an individual.

We found strong evidence to support the efficacy of creative arts interventions for children with ASD. Fourteen of the 15 studies used a control group for comparison. Although all creative arts interventions targeted different aspects of the child, no specific art form showed a greater effect than the others. The evidence suggests that art interventions allow children with ASD to express themselves through different media and gain a different perspective about themselves, others, and the world around them. The elements provided by art interventions appear to facilitate social learning in children with ASD. Our review supports the idea that creative art forms of the three included interventions (drawing and painting, music, and theater) influence the *OTPF–4* Performance Skills and Client Factors domains for children with ASD. Our review also provides evidence of the benefit of using different creative art delivery formats and durations to enhance occupation-based skills for children with ASD.

One of the 15 articles found a nonsignificant result (Richard et al., 2015). This intervention involved only one session and targeted performance skills. Richard et al.'s (2015) approach was to ask children to construct four different faces (happy, sad, angry, and fearful), using facial features of a mouth, nose, eyes, and eyebrows. The outcome measure was the DANVA

2–CF, which is used to assess facial expressions. The results indicated that both the control and intervention groups had a slight increase in scores, but neither within- nor between-groups differences were found in posttest scores. Richard et al.'s (2015) study also had a moderate risk of bias, implying that constructing facial expressions may not be an effective approach to use with children with ASD. This may be due to the fact that emotions do not have concrete features, so children with ASD cannot easily capture proper facial expressions.

We expect that children with ASD may require multiple sessions before the impact of an art intervention is observed. However, 1 article found that a single session of music intervention resulted in reduced stress levels (Poquérusse et al., 2018). Perhaps the client factor of stress level is more responsive to a single creative art activity session than the performance skills addressed in Richard et al. (2015)'s study.

General creative arts activities (e.g., painting or drawing) examined in this review were found to affect only targeted performance skills (social interaction skills). Our findings are consistent with those of previous research reporting that art activities, such as painting and drawing, can improve communication and social skills in children with ASD through effective self-expression (Schweizer et al., 2019). Through general art activities, children with ASD are given unique sensory experiences to safely communicate and develop social skills with the therapist or other children (Schweizer et al., 2019). Painting and drawing allow children with ASD to communicate through alternative channels and enhance self-expression (Chincholkar et al., 2019).

Music interventions targeted *OTPF–4* Client Factors and Performance Skills of social interaction and process skills. Music has been shown to improve arousal and attention (Bharathi, Venugopal, & Vellingiri, 2019) and communication skills (Brancatisano et al., 2020) in children with ASD. Our findings are consistent with those of previous studies and support the incorporation of music into occupational therapy interventions. Music activates specific parts of the brain, which can stimulate learning processes in children with ASD, resulting in positive behavioral changes (Bharathi, Jayaramayya, et al., 2019). Music also allows children with ASD to express themselves nonverbally (Bharathi, Venugopal, & Vellingiri, 2019), facilitating the active development of social skills.

Theater interventions were found to target social interaction skills (Performance Skills domain) as well as attention, emotion regulation, temperament, and personality (Client Factors domain). Our occupation-based review also supports previous research suggesting that theater interventions can enhance social skills and communication skills in children with ASD (Corbett et al., 2011). Previous research also suggests that the repetition and rehearsal aspects of theater interventions enhance learning and lead to improvements in social skills and communication. Through theatrical features, such as modeled behavior, children with ASD can learn how to identify social cues and develop positively reinforced appropriate behaviors (Corbett et al., 2011).

Implications for Future Research

Research with a higher level of evidence, such as multisite RCTs, is still needed to support the effectiveness of creative arts interventions for children with ASD. At present, no guideline exists to help occupational therapists design treatment plans that include creative arts components for children with ASD. We suggest that future research examine whether one form, or a combination of multiple creative art forms, is more effective. In addition, future research could determine whether certain creative arts activities are more useful in developing performance and participation in certain *OTPF–4* domains and whether specific durations and intensity are most effective.

Limitations

We included only Level 1b or 2b evidence in this review; we excluded studies at other evidence levels. Although it is important to review higher level evidence, studies at other evidence levels may provide crucial information. For example, we noticed numerous case studies and feasibility studies that examined the efficacy of painting and drawing interventions, but we excluded them because of our inclusion and exclusion criteria. Also, all 4 of the theater interventions used the same theater intervention structure, SENSE theater. Although the intervention was supported by the evidence, our review did not include studies with other types of theater interventions. Therefore, our findings may have limited generalizability regarding the art modalities that can be recommended for this target population.

Implications for Occupational Therapy Practice

This review has several implications for occupational therapy practice. First, the findings support occupational therapists' use of creative arts interventions to enhance performance skills and client factors among children with ASD. Painting and drawing, theater, and music interventions were found to be beneficial in several *OTPF–4* domains. Occupational therapists can incorporate creative arts components into their interventions when working with children with ASD. Second, occupational therapists can design creative arts interventions for children with ASD that are based on the duration and intensity provided in Table A.2. We also suggest that more than one treatment session may be more effective when targeting performance skills. Finally, our review supports the concept that different *OTPF–4* domains can be enhanced through the

use of different forms of creative arts interventions for children with ASD. Occupational therapists can provide evidence-based creative arts interventions to meet the needs of this population.

Conclusion

This review provides evidence of the efficacy of creative arts interventions to enhance occupation-based outcomes for children with ASD. This scoping review indicates that painting, drawing, music, and theater can improve *OTPF–4* client factors and performance skills in children (ages 3.5–16 yr) with ASD, specifically in process/social interaction skills and body functions. Our findings suggest that multiple sessions may produce more substantial improvements and should be used when targeting performance skills. We also found that group and individual intervention sessions had similar treatment effects for children with ASD. To support evidence-based practice, we recommend that occupational therapists design creative arts interventions for children with ASD based on the duration and intensity provided in this review. Our findings support occupational therapists' incorporation of creative arts components in the treatment of children with ASD to enhance client factors, process, and social interaction skills.

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Allison Bernier is Entry-Level Occupational Therapy Doctoral Student, Department of Occupational Therapy, University of Texas Medical Branch, Galveston.

Karen Ratcliff, PhD, OTR/L, is Associate Professor, Department of Occupational Therapy, University of Texas Medical Branch, Galveston.

Claudia Hilton, PhD, OTR/L, is Associate Professor, Department of Occupational Therapy, University of Texas Medical Branch, Galveston.

Patricia Fingerhut, PhD, OTR/L, is Professor and Chair, Department of Occupational Therapy, University of Texas Medical Branch, Galveston.

Chi-Ying Li, PhD, OTR/L, is Associate Professor, Department of Occupational Therapy, University of Texas Medical Branch, Galveston; chili@utmb.edu