

Use of a Behavioral Art Program to Improve Social Skills of Two Children with Autism Spectrum Disorders

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Abstract: The purpose of this study was to investigate the effectiveness of a behavioral art program in improving social skills for two children with autism in group settings. A multiple probe design across behaviors was used. The results indicated that for both children, the program increased the percentages of spontaneous verbal communications, presentation of artwork, and eye contact. One of the children showed a concurrent decrease in off-seat behavior. Both children maintained high levels of performance on the target social skills three weeks after the treatment. Social skills were generalized to different settings with another instructor and an unfamiliar audience. The increased scores on both children's adaptive behaviors indicated that both the teachers and the parents perceived that the art program was effective in improving the children's social skills.

One of the distinct characteristics of individuals diagnosed with autism spectrum disorders (ASD) is the lack of reciprocal social communications. Such deficits in socialization can be present in these individuals with or without any other cognitive or developmental delays (American Psychiatric Association, 2013). Social impairments in children with ASD can possibly develop with age or improve through natural interactions with others in the environment. As Tantam (2003) pointed out, when children with ASD progress to late elementary and early adolescence, they continue to experience difficulties in an increasingly complex social environment that requires more sophisticated social repertoires and eventually becomes a source of distress. Studies that investigated group interactions in mainstream classrooms reported that students with ASD often express poor social support and were more likely to experience social isolation than their typical peers (Bauminger,

2003; Bauminger & Kasari, 2000). Integrating these individuals with typical peers may increase potential opportunities for social interactions, although it does not automatically improve their social skills unless these skills are specifically targeted and facilitated through adult or peer mediations (Weiss & Harris, 2001). With the number of children diagnosed with ASD rising, it is imperative to develop intervention programs aimed at improving social skills.

Applied behavior analysis (ABA) has offered effective treatment strategies in many areas for individuals with ASD, though the clinical treatments targeting social skills for this population are still in need of more research (Weiss & Harris, 2001). Currently, some of the strategies include arranging motivating operations to teach spontaneous verbal communication in contrived and natural environments (e.g., Endicott & Higbee, 2007), using various prompting procedures to increase joint attention (e.g., Taylor & Hoch, 2008; Whalen & Schreibman, 2003), pivotal response training to facilitate different aspects of social interactions (e.g., Pierce & Schreibman, 1995), using scripts to teach verbal initiations (e.g., Woods, & Poulson, 2006), multiple exemplar training to teach sharing

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(Marzull-Kerth, Reeve, & Townsend, 2011), and the video modeling to promote social responses to peers (Jones, Lerman, & Lechago, 2014). It is noted that most research designed to teach social skills involve the use of tangible items or activities, such as preferred toys, objects and activities to facilitate the acquisition of target social behaviors with an adult or peers.

Besides ABA treatment, the application of art therapy to facilitate social skill development for children with ASD has been proposed as an alternative. For example, Cooper and Widdows (2004) speculated that children with ASD who are typically visual and concrete learners can better communicate their feelings, emotions, or desires through art activities that match their learning styles. It is relatively easy to solicit individuals with ASD to participate in art activities because they can express themselves in a way that is more likely to be accepted by their peers, thereby reducing their anxiety of social rejection or problem behaviors (Epp, 2008; Noble, 2001). Many case studies have reported the relationship of art activities and the qualitative improvement of social behaviors for children with ASD (e.g., Elkins-Abuhoff, 2008; Emery, 2004; Kearns, 2004). Epp (2008) used a social skills questionnaire for parents to evaluate the effectiveness of an art therapy group and also reported art therapy as an effective treatment to improve social behaviors for individuals with ASD. Roth (2001) proposed a behavioral approach to art therapy that incorporated several behavioral techniques (e.g., reinforcement, prompts, specific objectives) into the practice of art therapy and found that the process successfully addressed the social and emotional needs for many cases of children with ASD.

Although the above-mentioned studies proposed the possibility of art therapy to improve socialization deficits in individuals with ASD, none of these studies have used experimental designs involving direct and objective measurements of outcome behaviors. The comparison of behaviors before and after the implementation of treatment procedures was either descriptive in nature, based on the observation of the therapists, or rated via indirect assessment that relied completely on parental perceptions (e.g., Epp, 2008). Further,

the target behaviors of treatment were not specifically defined for each individual. Very little description was found that informed the reader of each participant's skill levels. None of them described specific treatment procedures of art therapy being conducted, rendering replications impossible. Despite the speculated advantages and potential usages of art therapy in treating social impairments for individuals with ASD, such a treatment remains more of an art than a science.

Research on embedded instruction suggested that target behaviors can be effectively taught during ongoing activities (e.g., Johnson, McDonnell, Holzwarth, & Hunter, 2004). Johnson et al (2004) contended that the embedded instruction strategy incorporates structured instruction into daily routines to maximize performance opportunities of target behavior in natural settings. From the literature, it seems possible to embed social skills instruction in art activities to facilitate social skills learning for individuals with ASD; however, research in this area remains limited.

Venn et al (1993) embedded imitation requests in art activities with time delay prompts, successfully increasing peer imitation behaviors for three children with autism and developmental disabilities. All children in the study demonstrated novel imitation (e.g., fine motor actions) via daily art activities in generalized settings. However, any other forms of social interactions were not targeted in the study.

Ingenmey and Van Houten (1991) instructed a student to draw pictures and tact his drawing (e.g., "I made a sun") to solicit adult praises. The results showed that the student spontaneously emitted more trained and untrained tacts after the treatment of a time delay prompt procedure. This suggested a possibility of using an art activity as a medium to facilitate relevant verbal communications. The focus of their study only targeted tacts (e.g., description of what was in the picture), but not any other form of verbal operants or verbal exchanges between a listener and a speaker in a social situation. It is necessary to expand the finding of these studies to further examine whether specific social skills training can be embedded into art activities, along with appropriate treatment strategies, to promote

various aspects of social interactions in natural environment for children with social or communication deficits.

Got and Cheng (2008) used a randomized experimental design and found that an art program improved perceived social interactions by parents for individuals with developmental disabilities. The art program consisted of art making activities with various types of art materials, group artwork, and the sharing of artwork and feelings. The use of a group experimental design demonstrated the strength of their study, but the specific procedures of art activities that occurred in these sessions were not described, making replications of their study impossible. Their study also did not include clear descriptions of participants' skill sets in cognitive and social domains, and the outcome measures used questionnaires instead of direct measures of observations.

Banks, Davis, Howard, and McLaughlin (1993) used a single case experimental design to compare the effects of art activities on direct measures of social behaviors of three children with developmental disabilities. Compared to the control condition where children were simply provided with art materials with general verbal directions (e.g., you have 15 min for this activity), they reported that art activities with instructor's specific directions resulted in relatively high levels of social initiation with peers and appropriate eye contact and a relatively low level of aggressive behaviors. Their results suggested that directed art activities had positive effects on social behaviors of children with disabilities. Additional empirical evidence, such as systematic replications, is still needed to validate procedures involved in behavior art procedures, resulting in the improvement of social behaviors for individuals with ASD and developmental disabilities.

Even though the studies reviewed above have documented that social skills can be facilitated through various items/activities in conjunction with appropriate behavioral treatment strategies, research has not yet examined the effects of using art activities as medium to facilitate the improvement of socio-communicative skills for individuals with ASD. The purpose of the present study was to validate whether a behavioral art pro-

gram was effective in increasing social skills for two children with ASD in group settings, including spontaneous verbal communications, presentation of artwork, and eye contact. The concurrent decrease of off-seat behavior for one of the two participants was measured. Parental perception of their children's adaptive behaviors in the domains of expressive communication, interpersonal relationships, play and leisure time, and coping skills, were measured with the Vineland Adaptive Behavior Scales (VABS) (Wu, Chang, Lu, Chiu, 2004).

Method

Participants

Two 6-year-old boys, Eng and Cheng, were recruited through an announcement posted on the website of a university-affiliated autism treatment center. Eng was diagnosed with an ASD and attention deficit hyperactive disorder (ADHD), and Cheng was diagnosed with an ASD. According to parental reports, both children received their diagnosis by the same pediatric physician in a medical center when they were 3 years old. However, their evaluation records were not required for them to participate in the study. The criteria for recruitment to participate in this study included a) the child must have a diagnosis of ASD, b) the child has basic verbal communication skills, and c) the child is observed to have difficulties in social interactions with others. When registering their child for this art program, the parents were informed the nature and purpose of the study. Appropriate informed consent was obtained from the parents. The experimenter (the first author) also explained the content of art lessons and the requirement of presentations to each child and obtained their assents.

At the time of the study, Eng received a center-based behavioral treatment program for children with autism for 2 hours per day and 2 days per week after school. He attended a public elementary school in a regular education room but was pulled out for 1 to 2 hours daily to a resource room for children with special needs. His verbal skills consisted of following verbal instructions, manding with incomplete sentences, and tacting about 100 objects (i.e., body parts, actions, animals,

food, places). At the time of the study, he could tact four basic emotions (i.e., happy, sad, angry, scared). In the area of intraverbal skills, he could answer and ask WH-questions for information (i.e., what, who, where, when). Eng was selected for the study because his teacher reported that he was disruptive in class by leaving his seat frequently, did not communicate effectively with the teacher, was engaged in either repetitive or solitary play activities during free play time, did not have social interactions with peers, and had difficulties talking in public (e.g., show and tell).

Cheng had received behavioral treatment for one year prior to the study. He also attended a public elementary school in a regular education room and received physical therapy, occupational therapy, and speech pathology in a private medical center after school hours during the study. His basic verbal skills included following verbal instructions and tacting more than 100 objects (i.e., body parts, actions, animals, food, places, furniture, and vehicles). He answered and asked WH-questions (i.e., where, what, who, when, which, how). During free play time, he enjoyed playing with all kinds of play mobiles and vehicles. He tacted basic emotions and was learning generalized tacts of emotions under different contexts (e.g., when seeing a boy eating ice cream in a picture, he would say "The boy feels happy because he is eating ice cream."). He was selected for the study because his parents were concerned that he often expressed his needs and frustration through whining. His teacher also reported that he did not talk or have appropriate social interactions with the teacher and peers, and avoided talking in public (e.g., answering teachers' questions in class).

Setting and Materials

The study was conducted in a behavioral treatment center affiliated with a university located in a major city in Taiwan. Therefore, all treatment programs were delivered in Mandarin. All sessions were conducted in the classroom of the treatment center. The classroom was 8 m by 2.7 m, and 2 m from floor to ceiling. It contained a play area with toys and books on shelves, two tables with four chairs for treatment sessions, and two video cameras

for recording all sessions. Maintenance and generalization sessions were conducted by another therapist in the conference room with the presence of other children and therapists as their audience.

Creative art materials used included crayons, pencils, colored pens, colored pencils, paint brushes, watercolor, poster paint, markers, colored tape, magazines, glue, resin, scissors, pictures, drawing papers, wall papers, corrugated papers, picture books, dolls, boxes, and cartons (see Table 1 for a list of materials used for each session). Each participant was provided with a sheet of drawing paper (54 cm × 39 cm). The behavioral art treatment activities were divided into four themes: creativity, my family, myself, and my summer vacation (see Table 2 for a complete list of target behaviors, activity topics, and themes used under various conditions in this study).

Experimental Design

A multiple probe design across behaviors (Cooper, Heron, & Heward, 2007) was used to evaluate the effects of the behavioral art program. Following the baseline, behavioral art sessions were introduced to treat the target behaviors in the order of verbal communication, presentation of artwork, and eye contact. No reinforcement sessions followed when the target behaviors (verbal communications and presentation of artwork) reached criterion performance. The maintenance and generalization sessions were conducted three weeks after eye contact (last target behavior) reached the criterion. No art activities sessions or other practice opportunities for the target behaviors were offered during treatment sessions during this period of time.

Response Measurement

Direct measures of social skills. The dependent variables were the children's social skills, including verbal communications, presentation of artwork, and eye contact. A partial interval recording system was used to record each child's instances of verbal communications. Each one-hour art session was divided into a total of 240 intervals. An instance of

TABLE 1

Art Materials Used in Each Session

<i>Session</i>	<i>Activity Topic</i>	<i>Art Materials</i>
01	Free creative work	Drawing paper, color pencils, pastel, crayons, colored paper, glue,
02	Free creative work	picture books
03	Free creative work	
04	My family tree	Drawing paper, color pens, pastel, crayons, watercolor, brushes, palette, dollhouse, family dolls, handmade trees, family name cards, Scotch tape
05	The bubbles in mind	Drawing paper, color pencils, pastel, crayons, brushes, watercolor, palette, pictures of facial expressions, stories and videos about emotions
06	My dream	Drawing paper, color pencils, pastel, crayons, brushes, watercolor, picture books
07	Happy zoo	Drawing paper, pastel, color pencils, crayons, paste, brushes, watercolor, palette, non-woven material, picture books
08	Important things	Drawing paper, color pencils, pastel, crayons, brushes, watercolor, palette, treasure chests, colored paper, picture books
09	A tree buds	Drawing paper, pastel, ink, straws, crepe paper, pigment, palette, glue, picture books
10	Magic bubbles	Drawing paper, paint, straws, tennis balls, cups, dishes soap, brushes, watercolor, palette, bubble guns, water guns, hair dryers, picture books
11	The world of ocean	Drawing paper, pencils, color pencils, needle pens, signature pens, picture books
12	My hands	Drawing paper, pencils, dot stickers, color pencils, pastel, crayon, scissors, colored paper, paste, picture books
13	My eyes in lines	Drawing paper, pencils, paste, color pencils, pastel, crayons, wool, hair root, electronic picture books
14	My legumes face	Drawing paper, beans, paste, color pencils, brushes, watercolor, palette, mirrors, pastel, crayons, picture books
15	Memory book	Activity slides, pictures, pastel, magazines, glue, scissors, twin adhesive tape, cardboard, glitters, decorations, wrapping paper, elastic
16	Shiny summer	Drawing paper, pictures, pastel, brush, palette, watercolor, palette, ruler, scissors, twin adhesive tape, colored paper
17	The mask	Art masks, pigment, brushes, palette, decorations, elastic, picture books

verbal communication was defined as asking relevant questions, making relevant comments, requesting materials, and responding to others' questions during a 15 s interval. The independent responses were recorded as "+," prompted correct responses as "p" (counted as "-" in calculation), and no responses or incorrect responses as "-." For example, during an art session with a topic about animals, when the child spontaneously made a comment, "Elephant is my favorite animal," this response would be recorded as a "+" for the interval. Similarly, if a child provided an adequate answer (e.g., "elephants") in response to the instructor's question (e.g., "What animals do you like?"), it was recorded as a "+."

However, if the child did not respond, or if he responded incorrectly (e.g., "Red"), it was recorded as a "-" for that interval. Only the independent responses were counted as correct, and the prompted responses and no responses were counted as incorrect. For example, when the child did not respond to the question, "What animal do you like?" The instructor would show a page to the child and say, "Wow! The forest is so colorful," pause for a few seconds, and continue, "See, this animal is doing something special to make the forest so colorful!" If the child still did not comment, the instructor would ask some other questions for the child to respond (e.g., "What is the fox doing?" or "What else did you see in this

TABLE 2

Target Behaviors, Activity Topics, and Themes Across Conditions

<i>Session</i>	<i>Condition/Target Behavior</i>	<i>Activity Topic</i>	<i>Theme</i>
01	Baseline	Free creative work	Theme 1: Creativity
02		Free creative work	
03		Free creative work	
04	Treatment/Verbal communication	My family tree	Theme 2: My family
05		The bubbles in mind	
06		My dream	
07		Happy zoo	
08	Treatment condition/ Art work presentation	Important things	Theme 3: Myself
09		A tree buds	
10		Magic bubbles	
11		The world of ocean	
12	Treatment condition/ Eye contact	My hands	Theme 4: Review of my art work
13		My eyes in lines	
14		My legumes face	
15	Verbal communication+Art work presentation	Memory book	
16		Shiny summer	
17	Generalization	The mask	

page?”). During the 15 s intervals, if a correct response occurred along with any other incorrect response, it was recorded as a “–” for that interval. The percentage of verbal communication was calculated with the number of intervals with independent responses divided by the total number of intervals, and multiplied by 100.

Presentation of artwork consisted of five steps, including (1) holding the permanent product facing the audience, (2) introducing himself (e.g., “Hello everyone, my name is Eng”), (3) stating the topic (e.g., “The topic is about animals”), (4) describing the content (e.g., “I drew an elephant. It is singing and dancing”), and (5) ending (e.g., “Thank you for your attention”). Each step was recorded as a discrete response. Each independent, correct response was recorded with a “+,” a prompted response as a “p” (counted as a “–” in calculation), and an omission of any step, an irrelevant statement, or an incomplete sentence was recorded as a “–.” Only full sentences were recorded as correct. If a child only said an incomplete sentence, the instructor would provide a prompt for a full sentence. The percentage of presentation was calculated by dividing the number of correct steps by 5 (the total number of steps) and multiplying by 100.

An instance of eye contact was defined as looking at another person’s face for at least 3 s when talking to that person during the entire session. The percentage of eye contact was calculated by dividing the number of eye contact by total opportunities of eye contact and multiplying by 100. An opportunity for an eye contact was defined as a situation where the child talked to another person or an audience, asked for materials, made a comment, or answered questions of another person. When an audience was present, the child was required to look at least one person for 3 s in order to be scored as a correct response.

Indirect measure. The parents’ and teachers’ perception of students’ improvement in adaptive behaviors was measured with the VABS (Wu, et al, 2004). The children’s parents and school teachers were interviewed with the VABS before the onset and after the completion of the study. The scores of parents and teachers were averaged for each child. Parents were informed of the nature of the study via the parental informed consents obtained prior to the study, whereas the school teachers were not aware of the nature of the study.

TABLE 3

Treatment Integrity Check List

	Content	Check	Remark
Preparation	Getting materials and equipment ready before sessions	Y ☐ N ☐	
Treatment	Time control (warm-up: 15 m, work time: 35 m, presentation: 10 m)	Y ☐ N ☐	
	Obtaining the children's participation and attention by establishing motivations	Y ☐ N ☐	
	Give appropriate feedback	Y ☐ N ☐	
	Give verbal praises/tokens for the independent responses of target behavior	Y ☐ N ☐	
	Use verbal prompts for verbal communication	Y ☐ N ☐	
	Use textual prompts for showing	Y ☐ N ☐	
	Use gesture prompts for eye contact	Y ☐ N ☐	
	Fade out prompts progressively	Y ☐ N ☐	

Inter-observer Agreement and Procedural Integrity

All sessions were videotaped for the purposes of data collection, inter-observer agreement, and procedural integrity. To assess inter-observer agreement and procedural integrity, a second observer (a graduate student) who was naïve to the purpose of the study was trained to record data from the videotapes independently and separately from the experimenters. The data of agreement on all target behaviors and procedural integrity were collected for 35% of the total sessions, and randomly distributed across conditions. For inter-observer agreement, the agreement on correct responses and incorrect responses was assessed by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. The agreement averaged 93.3% with a range from 82.3% to 100%. The assessment of procedural integrity was conducted by a second observer from videotapes using a checklist (see Table 3). Each accurate implementation was checked under Y, while an inaccurate implementation or omission was checked under N. The percentage of integrity was calculated by dividing the number of checks on Y by the number of checks on Y plus checks on N and multiplying by 100. The data on procedural integrity were 100% for all sessions observed.

Procedure

Baseline. During each baseline session, the experimenter introduced the topic, asked

questions to make certain the participants understood the instruction, arranged necessary materials for the artwork, waited for the participants to complete the work, and asked them to show their work to the audience (two other instructors and three to five children in the center). General social praise for appropriate behaviors (e.g., "Good job") was provided throughout baseline sessions. If the students spontaneously asked questions or made comments, the instructor would answer their questions or make general comments (e.g., "Yeah, that is good.") After they completed the work, the instructor would say "Let's show your work," without specific instructions, but delivered general praise for appropriate behaviors.

Intervention-the behavioral art program. The independent variable consisted of a behavioral art program, which incorporated behavioral tactics throughout the art sessions. The behavioral tactics involved in the package included (a) manipulation of motivating operations (MOs), (b) implementation of a token economy, and (c) use of prompting procedures. The sequence of behaviors targeted in the multiple probes across behaviors design was (a) verbal communications, (b) presentation of artwork, and (c) eye contact.

Each art session lasted 60 min, which contained (a) a warm-up activity (15 min), (b) work time (35 min), and (c) presentation of artwork to another participant and/or to the general audience (10 min). In the beginning of each treatment session, the instructor intro-

duced the topic with a warm-up activity by telling a relevant story or introducing an activity, asking questions, and inviting the participants to engage in the activity. She then presented the art materials and guided the participants to use the materials. For example, during the “My family tree” activity, the instructor presented a dollhouse with various rooms and figures representing family members. The participants were invited to introduce the family members of theirs using the figures and the items in the dollhouse and were asked what activities they would typically do in different rooms of their houses. After that, the instructor presented the materials, demonstrated how to use the materials, and let the participants practice using the materials.

The first author created all art lesson plans in references of Davalos (1999), Flowers (1992), and Houl (2011). Interested readers can refer to these books for ideas of various types of art activities. Specific procedures for each lesson can also be obtained upon request from the corresponding authors.

The first target behavior was to increase the number of spontaneous verbal communications. The MOs arranged to increase the occurrences of verbal communications included (a) withholding the materials necessary for tasks, (b) presenting the materials unfamiliar to the children without showing how to use them, and (c) looking at one of the children and making relevant comments on the given topic. Each instance of MO manipulation was defined as an opportunity to have a verbal communication, and the instructor created a total of 20 opportunities for each child for each session during warm-up and work time. During these opportunities, the children were told to start working without necessary materials (e.g., “Go ahead and start your creation!”), or given unfamiliar materials without being shown how to use them (e.g., “Use these things for your creation!”). If the child did not respond, the instructor would provide verbal prompts (e.g., “What do you need?” or “What happened in the forest?”). If the child asked for materials or how to use them, the instructor delivered them immediately; if not, the instructor would give partial echoic prompts (e.g., “I want. . . .” or “How to. . . .?”). When the child spontaneously responded to the in-

structor’s verbal comments, the instructor would give specific verbal feedback (depending on the child’s responses) and deliver a token. However, if the child responded with any verbal prompts, the instructor would deliver specific feedback, but no tokens. All responses occurred under MOs as well as verbal prompts were recorded as “p” and counted as “–” in calculation of percentages of correct responses. However, spontaneous responses occurred under MOs were recorded as “+.”

The second target behavior was presenting the artwork to a group of three to five people following a five-step instruction. During treatment, the five steps were initially presented with five individual textual cards with written directions as prompts. If the child followed each step in his presentation, the instructor would provide verbal praise specifically for each step along with a token after the presentation. If the child failed to follow the five steps, the instructor would deliver a correction trial for each step omitted at the end of the presentation. A token was dispensed immediately for each child following the presentation, regardless of their performance.

The third target behavior was eye contact during the entire art session. During treatment, the instructor first looked at the child, talked to him, and waited for 3 s for the child’s verbal response along with eye contact. If the child verbally responded with appropriate eye contact within 3 s, the instructor made relevant comments and delivered social praise on eye contact along with a token. If the child verbally responded without eye contact, the instructor ignored the child initially, waited 3 s, and then gave the same antecedent as well as a gestural prompt (i.e., pointing with an index finger to direct the child’s eye contact to the instructor), and made comments. The same procedure was in effect when the child spontaneously made a verbal request or comment but failed to look at the instructor when doing so. Note that eye contact was not required during the treatment of verbal communications and presentations.

No reinforcement. The no reinforcement phase was implemented immediately following the mastery of verbal communications and artwork presentations but was not implemented after eye contact due to time constraints. During this phase, the MOs were

identical as in the treatment, but the instructor did not deliver any prompts or tokens for children's verbal responses. General social praise was provided for appropriate behaviors. Similar to the treatment phase, responses occurred under contrived MOs were recorded as "-." It was noted that children's spontaneous verbal responses tended to be evoked by the novelty of the materials without contrived MOs during this phase.

Maintenance and generalization. Generalization across a different instructor and in another setting was conducted three weeks following the no reinforcement phase with an identical procedure as in the no reinforcement phase. The sessions were conducted by another instructor and two other children unfamiliar to the participants in the conference room of the center. The instructor was in the same graduate program as the experimenter (the first author), who has also completed one-year course requirement and supervision in the ABA center. The conference room had an oval-shaped table with 10 seats and a screen projector without any toys or a play area.

Results

Figure 1 and Figure 2 depict the percentage of correct responses across three target behaviors for Eng and Cheng, respectively. The range and mean percentage of correct responses for target behaviors across conditions are summarized in Table 4. Both Eng's and Cheng's figures display a similar pattern: The percentage of correct responses was relatively low in baseline, increased and achieved criterion performance at a relatively high level, decreased slightly initially but gradually increased to a relatively high level during no reinforcement, and remained at a high level during follow-up maintenance and generalization sessions. For verbal communications, the percentage of correct responses was relatively low in baseline, increased after treatment was introduced, remained at the same level during no reinforcement phase with an increase at the end, and maintained at a high level during follow-up sessions. Data on artwork presentations during baseline were at a low level, but both children performed at a high level during treatment and remained at

high levels after treatment during no reinforcement and follow-up sessions. The percentage of eye contact was also relatively low in baseline, but increased to a high level during treatment and maintained during follow-up sessions.

Figure 3 displays duration (min) of off-seat behavior for Eng across conditions. During baseline, his off-seat behavior was between 15 to 18 min per session, but significantly decreased to a low level of zero to less than one min once treatment was introduced and remained zero during follow-up sessions.

Figure 4 displays the pretest and posttest scores of the VABS for Eng and Cheng, respectively. Scores are reported for only four sub-domains that are related to the target social behaviors in this study—expressive communication, interpersonal relationships, play and leisure time, and coping skills. Both children's scores were increased after the completion of the art program, suggesting improvements in their adaptive skills in these domains. Eng's scores in all four sub-domains increased from 39 to 47 in expressive communication, from 21 to 24 in interpersonal relationships, from 20 to 27 in play and leisure time, and from 8 to 20 in coping skills. Cheng's scores also increased in all sub-domains assessed, from 45 to 50 in expressive communication, from 17 to 19 in interpersonal relationships, 15 to 26 in play and leisure time, and from 9 to 18 in coping skills.

Discussion

Many students with ASD have been placed in regular education classrooms for the purpose of fostering social interactions in order to alleviate their deficits in this important area. It is, therefore, imperative to develop programs that facilitate social interactions in group settings. ABA has developed and validated various effective treatment strategies of socio-communicative skills for these individuals with ASD, and the results suggested the possibility of embedding social skills instruction into art activities. Advocates of art therapy have also proposed art therapy as an alternative to improve social skills for individuals with ASD. Although successful cases have been reported with a behavioral approach to art ther-

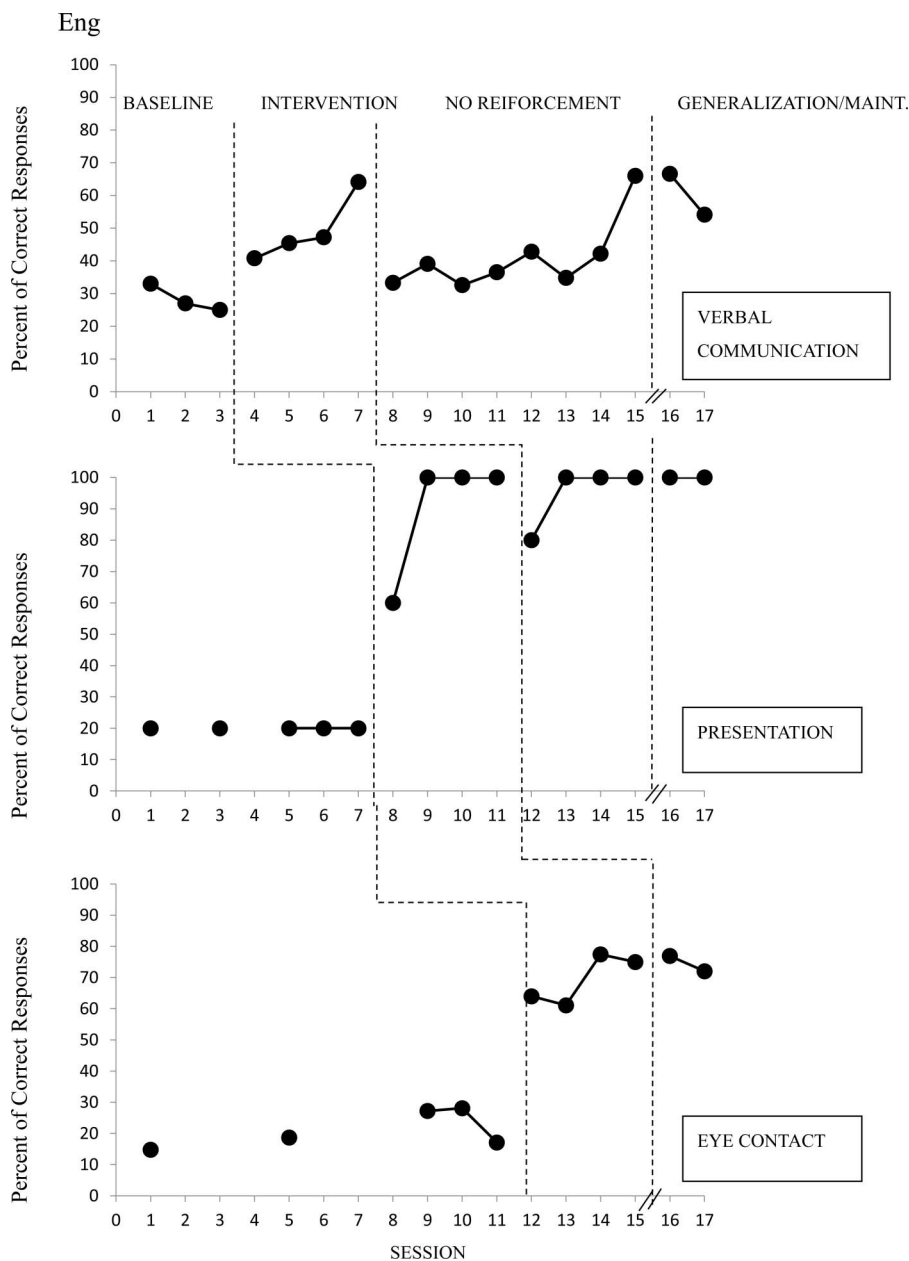


Figure 1. Percentage of correct responses of three target behaviors across all conditions for Eng.

apy (i.e., Roth, 2001), the descriptions of these cases did not include specific treatment procedures as well as social behaviors improved as a result of therapy.

The present study was the first attempt to empirically investigate the effectiveness of a behavioral art program designed specifically

to improve three particular socio-communicative deficits for two children with ASD—verbal communications, presentation of artwork, and eye contact. The results indicated that the program is effective in improving all three target social behaviors for both children in group settings. During baseline, all

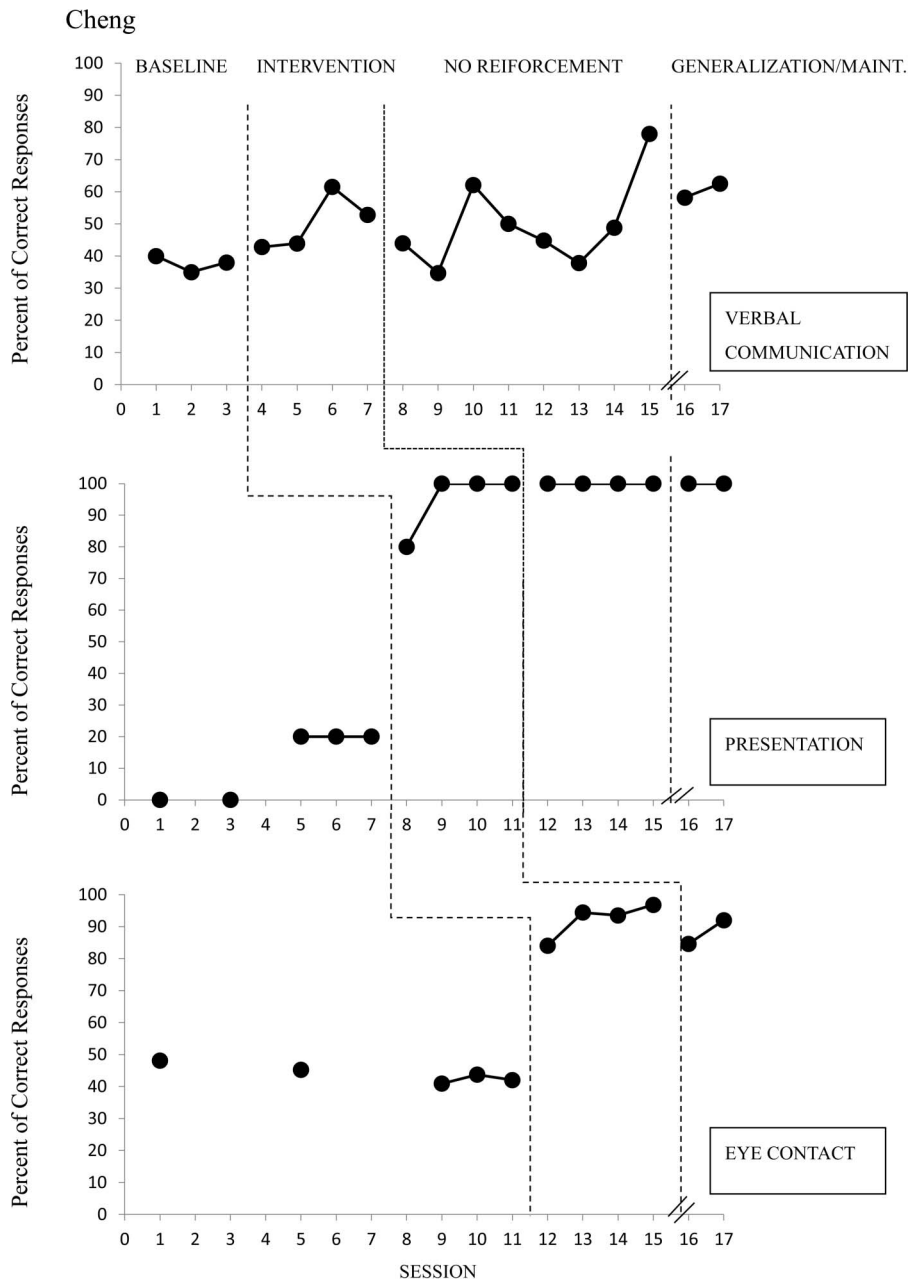


Figure 2. Percentage of correct responses of three target behaviors across all conditions for Cheng.

three behaviors were present but at relatively low levels, suggesting art activities alone did not increase these behaviors. However, after the treatment, which incorporated behavioral tactics targeting specific skills, both children were able to increase

spontaneous target responses to relatively high levels.

Specifically, the percentage of spontaneous verbal communications was increased during treatment with the arrangements of MOs, social praises, and tokens. During the no

TABLE 4

Mean (range) Percentage of Correct Responses of Target Behaviors Across Conditions

<i>Sessions/ Target Behaviors</i>	<i>Baseline</i>	<i>Intervention</i>	<i>No Reinforcement</i>	<i>Maintenance/ Generalization</i>
Eng				
Verbal communication M (range)	28.3 (25–33)	49.3 (40.8–64.1)	40.9 (32.6–55)	60.3 (54.1–66.6)
Presentation M (range)	20 (20–20)	90 (60–100)	95 (80–100)	100 (100–100)
Eye contact M (range)	21.1 (14.8–28.1)	69.3 (61.1–77.4)		74.4 (72–76.9)
Cheng				
Verbal communication M (range)	37.6 (35–40)	50.2 (42.8–61.5)	50 (34.7–78)	60.3 (58.2–62.5)
Showing M (range)	12 (0–20)	95 (80–100)	100 (100–100)	100 (100–100)
Eye contact M (range)	43.9 (40.9–48.1)	92.1 (84–96.8)		88.3 (84.6–92)

reinforcement phase, MOs were still arranged, social praise was provided to general attending behaviors, and tokens were not distributed to reinforce verbal communications. Despite a slight decrease in the beginning of the no reinforcement phase, both children’s verbal communications gradually increased to a high level during this phase and maintained at that level during follow-up sessions. Observations from the videotapes showed that both children’s verbal communications were exclusively limited to the instructor, relying on the MOs

and partial echoic prompts, while they began to engage in brief conversations with each other (e.g., obtaining materials or making comments to another child) during the no reinforcement phase. It is probable that, for these two children, verbal communications may initially require MOs along with artificial contingencies (e.g., tokens), but once the skill is acquired, it can be maintained with natural contingencies and generalized to a peer. In other words, “true” social exchanges have occurred in these two children because one child spontaneously

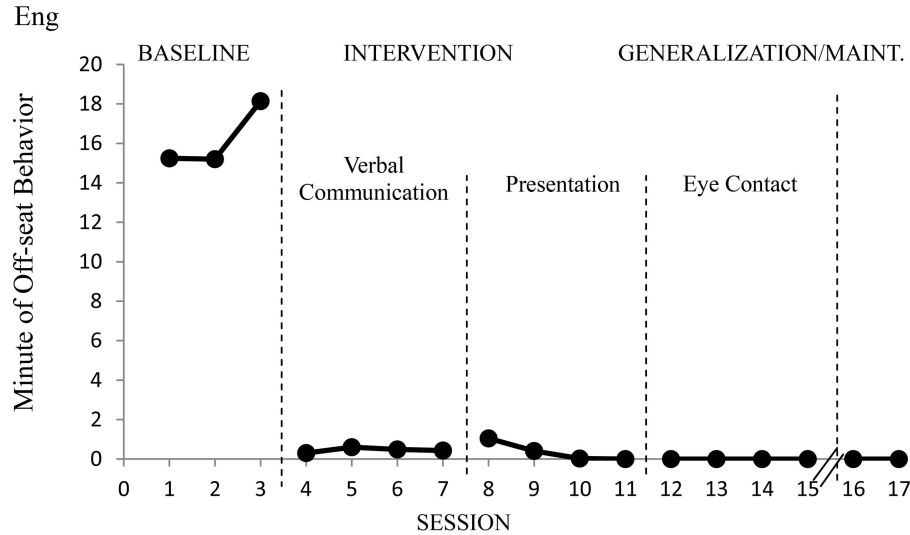


Figure 3. Duration (Min) of off-seat behavior during art sessions for Eng.

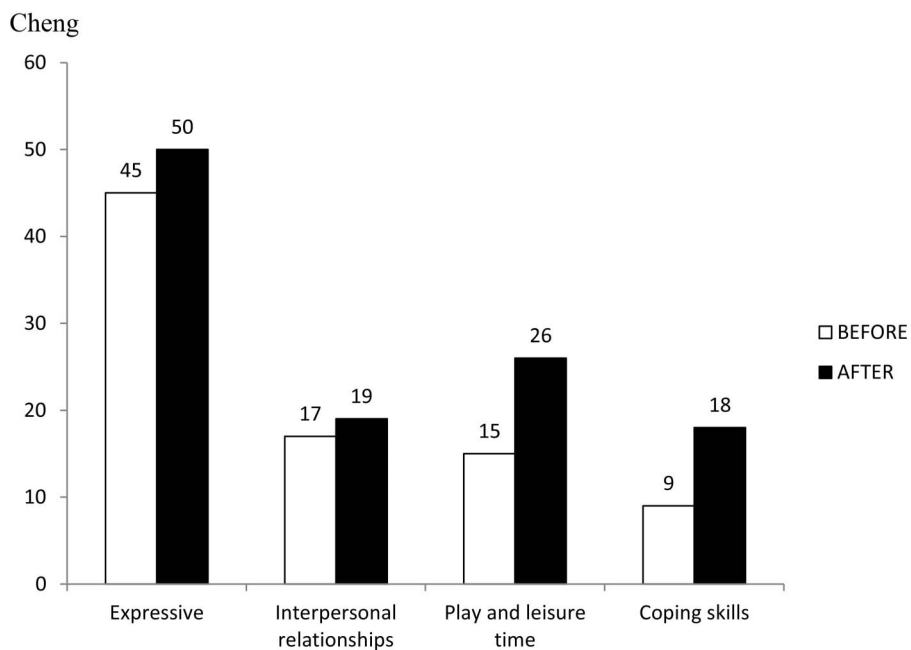
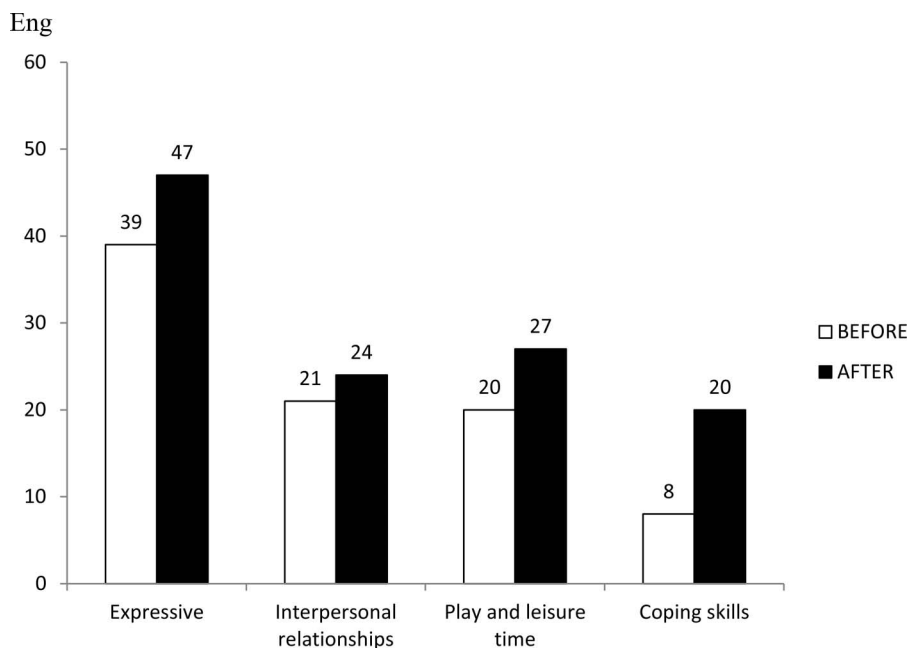


Figure 4. The pretest and posttest of VABS for Eng and Cheng.

initiated an opportunity of communication, and another peer's response has become reinforcing to such an initiation. Despite the phenomenon observed, the present study is limited because student's communi-

cation with one another was not formally taught and measured, thus, it is in need of further investigations.

The artwork presentation skill was soon acquired through textual prompts in conjunc-

tion with token delivery. The data observed suggest that both children not only acquired the skill to follow a five-step written direction, but, more importantly, they have acquired the skill to speak in front of an audience. The presentation skill was further enhanced with the introduction of the third target skill—eye contact—by requiring the children to look at the audience while speaking. Both children’s school teachers were very impressed with the children’s presentations because they had refused to participate in any activities in class involving public speaking prior to the study.

Similarly, eye contact for both children did not occur at a high level before treatment was implemented. In the beginning of the treatment, both children required gestural prompts and artificial contingencies (e.g., tokens) to acquire appropriate eye contact to the instructor and the audience. When they were observed to have spontaneous eye contact to the listener, the instructor would provide a token along with social praises for their eye contact. During the no reinforcement and follow-up sessions, their eye contact was maintained without artificial contingencies.

The study also extends current literature by incorporating behavioral tactics into art activities with direct measures of social skills for two children with ASD. We used various art activities embedded with behavioral tactics to increase spontaneous mand and intraverbal behaviors in group settings. Banks et al (1993) asked therapeutic questions (e.g., “How did you feel?”) while the children in their study engaged in art activities and found the children’s social behaviors improved after treatment. We included instruction targeting social skills through art activities. Thus, our study focused on improving social skills through art activities instead of using art for the purpose of psychotherapy. Overall, the results of the study suggest that it was effective to utilize art activities embedded with behavioral tactics targeting specific social skills for both children. Once these target skills were acquired, art activities alone could function to maintain acquired social skills and potentially facilitate generalizations of these skills to natural social interactions with peers in school settings.

The findings of this study have particular social and educational significance for the

learning of social behavior for these children. It is suggested that specific social skills can be acquired through art activities in order for the children to engage in social interactions with an adult or peer in group settings. Simply placing them in a social situation without individualized instructions targeting specific social skills did not result in the “natural” occurrence of such skills (e.g., baseline).

For Eng, his off-seat behavior observed frequently during baseline was decreased to a low level with zero occurrences in most sessions after the treatment was introduced. Cheng did not have this particular problem behavior. The decrease of Eng’s off-seat behavior is an incidental finding, as the disruptive behavior was not planned, and the data were recorded from videotapes after the completion of the study. Although only AB data are available, we speculate that this is a collateral gain of the behavioral art program due to either the reinforcing value of the art activities or adult attention given during treatment. It is also possible that once the verbal communication skill was acquired, individual attention from the instructor may be withdrawn, and the potential source of reinforcement came from social interactions with another peer or the art activities themselves. However, further research is necessary to empirically examine these variables.

Scores of VABS indicated that parents and school teachers perceived that the children’s social skills improved after the art program. The school teachers also reported that the children have been observed to engage in art activities in art class and were willing to share their artwork with the entire class during show and tell time. These anecdotal reports suggest that their presentation skills have been generalized to school settings. However, the generalization effect should be empirically tested for future studies.

The results of this study provide an empirical support of using art activities embedded with behavioral tactics to improve social skills for two children with ASD. However, more research is needed. For example, future studies could investigate whether a behavioral approach to art program can be applied to other group settings, such as in regular classrooms with students with ASD or ADHD. Other areas

of social deficits or problem behaviors displayed by some individuals with ASD can also be addressed with specific instructional tactics targeting these skills while doing art activities. Furthermore, generalization of adult-child interactions to child-child interactions can be planned as part of the treatment for future research.

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