Music Therapy Today
Vol. V (4) August 2004

MAKING FRIENDS IN MUSIC: INCLUDING CHILDREN WITH AUTISM IN AN INTERACTIVE PLAY SETTING

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Keynote 3 at the VIth European Congress of Music Therapy "MANY FACES OF MUSIC THERAPY" [1]
Jyväskylä, Finland June, 17th 2004, 9:45-10:30 am

1. The cumulative study presented in this paper is based on my doctoral dissertation completed under the direction of Prof. Dr. David Aldridge at the University of Witten-Herdecke, Germany. My deepest appreciation goes to the children and families, teachers and colleagues at the Family and Childcare program of the Frank Porter Graham Child Development Institute, University of North Carolina at Chapel Hill for their participation, dedication, and collaboration in these studies.

Abstract

Young children with Autism Spectrum Disorder frequently experience difficulties in making friends. Specific characteristics of autism, such as focusing on people in the environment, comprehending and using verbal and nonverbal language, playing meaningfully with toys and interacting with peers, may interfere with the ability to achieve group membership and to form friendships. The social ecology of interactive play settings may influence these children's social engagement, learning and development positively. Thus, children with autism are increasingly being included in community-based interactive play settings, receiving their therapeutic services in the context of ongoing class activities and routines. However, environmental arrangements and child-focused interventions emphasizing the children's strength and needs are necessary for successful inclusion.

This paper describes a cumulative case study design investigating the effectiveness of embedded music therapy interventions designed for the inclusion of young children with Autism Spectrum Disorder in an inclusive childcare program. Each of the three interventions addressed a key difficulty the targeted children faced during classroom activities and routines. These corresponded to (a) the morning greeting routine; (b) multiple-step tasks within classroom routines; and (c) peer interactions on the childcare playground. To increase the target children's independent performance, seven individually tailored songs and two pre-composed songs were used and an outdoor music center was added to the childcare playground. Children's individual educational goals, coupled with the strategies commonly used with children with autism, were taken into consideration in the design of the interventions and song development. Collaborative consultation, including staff development activities,

occurred prior to and during each intervention. The effects of these interventions were evaluated using single-case experimental designs.

The results indicated positive effects on all target children's performance within the childcare routine: In eight of nine cases, the songs produced desirable outcomes. The musical playground environment facilitated the involvement of children with autism with peers. The music therapy collaborative consultative approach enabled teachers to implement interventions successfully in ongoing childcare routines. Peer-mediated strategies increased peer interactions and meaningful play on the playground and laid the foundation for forming friendships.

Contemporary models of music therapy service delivery in inclusive childcare settings, particularly implications of the collaborative consultative approach, will be discussed, as will the need for future research and directions.

What we know about inclusion…

The socio-cultural environment is an integral force in a child's learning and development (Berk & Winsler, 2002; DEC, 2000; Piaget, 1951; Stern, 1985; Vygotsky, 1978). Full inclusion of children with special needs in their natural environments – such as community-based interactive play settings – has been supported on ethical, legal, and educational grounds (Wilson, 2002; Wolery & Wilbers, 1994). For young children with Autism Spectrum Disorder (ASD), whose social interactions and relationships, language and communication, and behaviors are significantly affected, early education and treatment can greatly enhance the child's ability to participate meaningfully in family and community life and to play a vital role in society (American Psychiatric Association, 2000; Autism Society of America, n.d.; TEACCH, 1999; National

Research Council, 2001; Wolery et al., 2001). Early experiments on inclusion give young children with ASD the opportunity to imitate peer models, interact and communicate with competent partners, provide realistic learning experiences in a natural environment, establish group membership, and lay the foundation for forming friendships with typically developing peers. Typically developing peers involved in such experiments, for their part, may improve their social skills and attitudes toward individuals with disabilities (Buysse, 1993; Jellison, 1985; Kluth, 2003; Peck, Odom, & Bricker, 1993; Wolery & Wilbers, 1994).

This knowledge has led to a trend toward more widespread placement of young children with ASD in community-based preschools or childcare programs (Dawson & Osterling, 1997; Handleman & Harris, 2001; National Research Council, 2001). But to ensure successful inclusion, the application of child-focused interventions emphasizing the child's strengths and needs as well as environmental arrangements are imperative (Danko & Buysee, 2002; Sandall, McLean, & Smith., 2000; Schwarz, 2002; Wolery & Wilbers, 1994).

Service delivery in interactive play settings

Several educational and therapeutic interventions and strategies have been suggested for effectively including and educating children with autism (Koegel & Koegel, 1995; National Research Council, 2001). Toward this end, the Division of Early Childhood (DEC) (Sandall, McLean, & Smith, 2000), as well as the Committee on Educational Interventions for Children with Autism (National Research Council, 2001), recommend that interventions be embedded in ongoing classroom routines. The rationale for inclusive service delivery is manifold (McWilliam, 1996; Wesley, 2004; Wolery & Wilbers, 1994): (a) to minimize

stigma and isolation by having the child remain in class with her/his peers; (b) to capitalize on the child's naturally occurring learning opportunities by providing support in context; (c) to increase the number of experiences that promote learning by addressing daily problems whenever they occur; (d) to promote social competence by keeping the child involved in activities with classroom peers; (e) to increase generalization by practicing the skills needed in the place they are needed; and (f) to ensure consistency by having all the adults working with a child be aware of the rationale for providing treatment and the implication of the intervention.

Contemporary service delivery in high-quality center-based childcare programs is based on an integrated therapy model – meaning specialized therapies are delivered in the context of the child's naturally occurring environments, routines, and activities (Dunst et al., 2001; Sandall, McLean, & Smith, 2000; McWilliam, 1996, 2000a, 2000b; Wesley, 2004). To ensure normalization, continuity, maintenance, and generalization, therapists work with the individual child or a group of children within the ongoing classroom routines, or as consultants to the classroom staff and families to embed therapeutic goals (National Research Council, 2001; McWilliam, 1996). Table 1 illustrates the continuum of six models of service delivery within inclusive childcare setting from a music therapy perspective (adapted by the author from McWilliam, 1995).

Occupational therapists (Dunn, 1996; Sandler, 1997), speech/language pathologists (Wilcox & Shannon, 1996), physical therapists (Rainforth & Roberts, 1996; Sandler, 1997), and special educators (Garfinkel & Schwartz, 2002; Venn et al., 1993; Wolery et al., 2002) have evaluated and successfully applied the integrated therapy model in inclusive child-

care settings. But this approach has not been widely applied, nor have music therapists yet evaluated it.

Music therapy — A suitable treatment option?

Music therapy has a long tradition of serving young children with special needs, especially those with autism (Alvin & Warwick, 1991; Nordoff & Robbins, 1977). Studies on interest in music and relative strength of musical abilities in children with autism (Applebaum et al., 1979; Blackstock, 1978; Thaut, 1987, 1988), and anecdotal reports on the quality of music as a means of nonverbal communication, social contact, and self-expression (Alvin & Warwick, 1991; Nelson, 1984; Nordoff & Robbins, 1968; Schuhmacher, 1994), suggest that music therapy is a suitable treatment option for individuals with ASD. Music therapy interventions address the challenges associated with autism in an intentional and developmentally appropriate manner and might be effective in facilitating development of core skills and personal growth. Key strategies applied to educating children with autism – such as individualization, structure and predictability, and emphasis on the child's strengths and individual needs – are incorporated in music therapy treatments or are part of the nature of music itself (AMTA, 2002). Music therapy also strongly supports and facilitates inclusion of children with special needs in various educational settings (Wilson, 2002). That said, the effectiveness of music therapy interventions for the inclusion and improvement of core skills in young children with autism enrolled in inclusive preschool settings is documented by few music therapists (Furman, 2001, 2002; Humpal & Wolf, 2003; Snell, 2002), and controlled studies of any kind are missing altogether.

Although music therapy services can either be provided directly to clients or through consultation with professionals and others directly involved with the client (AMTA 2003), only 13% of the music therapists in the U.S. provide consultative services in educational settings (Smith & Harrison, 1999). Some attention has been paid to embedded treatments and the collaborative and consultative models of music therapy service delivery as effective strategies for including students with special needs within public school settings (Furman, 2002; Humpal, 2002; Johnson, 2002; Snell, 2002). But the literature that has been published – program descriptions, guidelines, strategies, and outlines of the benefits of this model of service delivery – is not the result of formal scholarly research investigations but rather of formative best practices research. Additionally, no information is currently available to describe whether or not integrated models of service delivery, especially collaborative and consultative strategies, are common clinical practice in music therapy for serving young children with special needs in interactive play settings.

TABLE 1. Continuum of six models of music therapy service delivery in inclusive childcare settings.

Model	Individual Pull-Out	Small Group Pull-Out	One-to-One in Classroom	Group Activity	Individual During Routines	Consultation
Location	In music therapy room or other location apart from the classroom	In music therapy room or other location apart from the classroom	In classroom, often apart from other children	Classroom/ playground, small or large group	Classroom/ playground, wherever the child is	In or out of the classroom

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Therapy Focus	Directly on the child's therapeutic objectives	Directly on child(ren) with special needs' therapeutic objectives	Directly on the child's therapeutic objectives	On all children in group and on social skills; emphasizes focal child's needs	Directly, but not exclusively on the focal child	MT works primarily with the teacher; MT and teachers collaborate on the best approach the teaching staff should use in order to meet the child's identified goals
Peers	Not present	1-6 peers present	Peers present, but not involved	Some children in group have special needs, some not	Peers usually present	Present if occurring in childcare setting

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Music Therapist's (MT's) Role	Provide individual music therapy; exchange information before and after therapy with teacher	Provide group music therapy; exchange information before and after therapy with teachers	Provide individual music therapy in child's classroom; take child to an area and work on child's therapeutic objectives or conduct assessment; teacher prevents interruptions of therapy; provide and receive information before and after therapy to teacher	Provide group music therapy in the classroom/ playground with focus on a particular child; share professional knowledge and involve teacher in planning and implementation; take lead and co-lead	Provide individual therapy within the child's ongoing classroom/ playground routine; share professional knowledge with teacher and train teacher to use music therapy strategies; exchange information with teacher before and after routine	From expert consultation where the MT provides guidance, information, and training on the use of therapeutic techniques, to "collaborative consultation," where the MT (consultant) and teacher engage equally in defining the problem; identifying the goals of intervention; planning the intervention; and engaging in follow-ups

TABLE 1. Continuum of six models of music therapy service delivery in inclusive childcare settings.

Example	MT comes to classroom, takes the child to the music therapy room to work on the child's emotional expression through music and then returns the child to the class at the end of the session	MT takes four children to the music therapy room to work on social skills such as turn taking and then returns them to their classroom	MT goes to the classroom, takes the child to the circle time area, places instruments she has brought with her on the floor, and assess the child's nonverbal communication skills	MT goes to the classroom during circle time and has the whole class participate in social interaction songs and musical activities focusing on one particular child's peer interaction	MT goes to the playground and prompts the child to play the drums in the Music Hut, gives model for meaningful engagement and activities. Makes sure that teacher can watch and hear	MT observes children on the playground, then talks to the teacher while the teacher supervises the children, asking how things are going with a certain child and what she thinks they should do about any challenging behaviors

Most segregated to most integrated model →

Adapted by the author from McWilliam, R.A. (1995). Integration of therapy and consultative special education: A continuum in early intervention. Infants and Young Children, 7 (4), 29-38.

The research journey

The purpose of the following series of studies was to understand if individually designed music therapy interventions will increase the performance of seven young children with ASD during challenging routines in an inclusive childcare program and to learn if teachers can embed the interventions in the ongoing classroom routine. The interventions addressed difficulties the targeted children faced during (a) the morning greeting routine, (b) multiple-step tasks within classroom routines, and (c) peer interactions on the childcare playground.

The project was conducted at the inclusive Family and Childcare program of the Frank Porter Graham (FPG) Child Development Institute, which is affiliated with the University of North Carolina at Chapel Hill, USA (FPG Child Development Institute, 2002; 2004). The Family and Childcare program enrolled about 80 children from six weeks of age to five years old. Children with and without disabilities attended the same classroom, where the philosophy followed developmentally appropriate guidelines (Bredekamp & Copple, 2002). Of the 30% of the children with various disabilities, 11 were diagnosed with ASD by external agencies using the Psychoeducational Profile-Revised (PEP-R) (Schopler et al., 1990), Autism Diagnostic Observation Schedule (ADOS) (Lord et al., 1999), Vineland Adaptive Behavior Scales (Sparrow et al., 1984), Childhood Autism Rating Scale (CARS) (Schopler, Reichler, & Renner 1988), clinical observation, and parent interviews. Classroom peers included both male and females from different ethnic groups and were ages two to five. All experiments were undertaken in the childcare programs' inclusive classrooms or playground using the integrated therapy approach.

Diverse cultures' use of songs to accompany daily life activities and to heal (Hart, 1990; Morgan, 1994; Silver, n.d.) as well as the wide range of professionals using songs with preschoolers to address academic, social, language and communication, motor skills and to express emotions (e.g., Enoch, 2002; Furman, 2001; Humpal, 1998), led to the design of song interventions. At the FPG childcare program, well-known children songs were part of the curriculum and practiced during group activities. Using individualized songs with young children with ASD to increase their performance during challenging classroom routines seemed to be a promissing and manageable approach to be implemented by teachers into the ongoing classroom activities and routines. In all experiments, a unique song, matching the target child's temperament and demands of the identi-

fied difficulties, was written by the author in collaboration with the classroom teachers. Specific goals, strategies, and procedures were individualized for each target child, and predictable routines, structured teaching, and visual cues, as generally used with children with ASD, were taken into consideration in the interventions' design. The playground used in this study has been modified by adding an outdoor music center (Music Hut) so as to structure and create a musical environment that enhances the social and play experiences of young children with autism, together with their peers, in outdoor play.

The music therapy interventions were designed and implemented by using a music therapy collaborative consultative model of service delivery. Staff development activities on the use of music therapy techniques to implement the intervention were provided prior to each experiment. In addition to the teacher-mediated interventions, peer-mediated strategies were applied to increase peer interactions on the childcare playground (McGee, Morrier, & Daly, 2001). Parents and caregivers were fully included in the morning greeting routine intervention and supported through frequent communication prior to, during, and after the experiments. Classroom peers directly participated voluntarily in Experiment I and III. Caregivers participated in Experiment I; classroom teachers participated in all three experiments.

The effects of the following music therapy interventions were evaluated by using single-case experimental designs. This research methodology provides professionals in early intervention a controlled experimental approach to the investigation of a single child under different circumstances, as well as the flexibility to adapt the intervention to the child's needs and the particular treatment approach. Experimental control is achieved within the child, meaning that each child serves as his or her own control by comparing the child's performance across two or more

conditions over time (Alberto & Troutman, 1995; Aldridge, 1996; Barlow & Hayes, 1984; Hanser, 1995; Holcombe, Wolery, & Gast, 1994; Kazdin, 1982; Tawney & Gast, 1984; Wolery, Bailey, & Sugai, 1988).

Experiment I: Morning Greeting Routine

INTRODUCTION

For many children – those with and without disabilities alike – one of the most crucial transitions is that from home to preschool (Alger, 1984). Making transitions is particularly difficult for children with autism. The preferences for sameness and sensitivity to changes, as well as the lack of understanding of symbolic gestures (such as waving for greeting or good-bye), are among the defining characteristics of autism (Dawson & Osterling, 1997; Mesibov, Adams, & Klingler, 1997). A number of strategies, including the use of songs have arisen to support children with autism in making successful transitions. "Hello" and "good-bye" songs are often used in music therapy to establish a predictable routine and to structure the session, to welcome and get in contact with the individual or group, to give the individual undivided attention, and to establish awareness of where persons are and what comes next (Bailey, 1984; Hughes et al., 1990; Krout, 1987; Loewy, 1995). To initiate friendships among children with and without disabilities, Cooper and McEnvoy (1996) also suggest greetings that consist of a pat on the back, a brief game, or a greeting song.

METHOD

Participants. Participants in this study were Phillip and Ben, two three-year old children diagnosed with ASD (n=2) who exhibit difficulties with the classroom's morning greeting routine (see Case Vignette: Ben), and their peers with and without special needs (n=13), classroom teachers (n=5), and the target children's respective caregivers (n=2). The aim of

the intervention was to increase the independent performance of target children during the morning greeting routine by way of unique greeting songs implemented by classroom teachers and the inclusion of peers and caregivers.

Setting. The experiment occurred in the subjects' inclusive childcare classroom. The classroom curriculum allowed free play during the morning arrival time. Children engaged in different play areas by themselves or with each other.

Materials. A unique greeting song was composed for each subject, following the demands of the desired five-step morning greeting routine as well as a "Hello" picture symbol, which was employed by the subjects to greet classroom teachers and peers.

Experimental Design. Using an A-B-A-B withdrawal design for Phillip, and a modified version of this design (A-B-C-A-C withdrawal design) for Ben, the effectiveness of the song interventions was evaluated. The baseline (Conditions A) followed the steps of the morning greeting routine. The song intervention (Condition B) followed the steps of the morning greeting routine by using each unique greeting song. The song intervention (Condition B) was modified by eliminating the "goodbye" section of the routine (Condition C).

Procedure. During baseline, teachers greeted the subject and followed the identified five steps of the greeting routine as soon as the target child entered the classroom at morning arrival. During song intervention, the song, whose musical format and lyrics matched each of the five steps of the greeting routine, was sung by teachers, parent/caregiver, and classroom peers (see Case Vignette: Ben).

Measurements. Categories of behaviors were coded through direct observation using an event recording system.

Reliability. Reliability checks were carried out within each condition and for each child. The overall interobserver agreement for Experiment I was 94%.

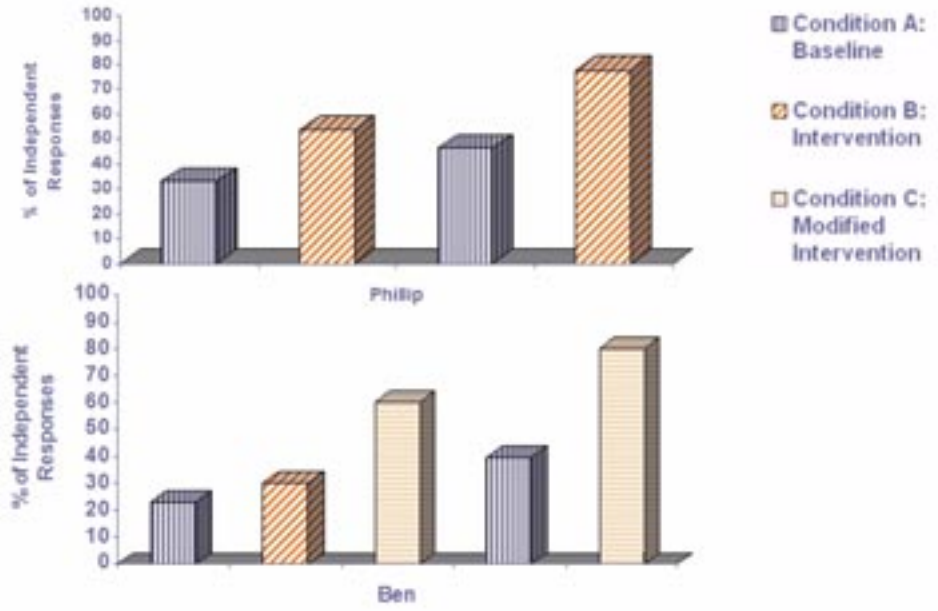
RESULTS

Phillip. The results of this investigation indicate that during baseline (Condition A) Phillip had a low level of independent performance (M=33.3%). With the introduction of the song intervention (Condition B), he steadily became more independent (M=54%). The withdrawal of the song intervention immediately decreased his performance (M=46.7%), and re-introducing the song increased his independence once again, this time on an even higher level (M=77.8%).

Ben. The results demonstrate that during baseline (Condition A), Ben exhibited a low level of independent performance (M=23.3%). The initial implementation of the song intervention (Condition B) did not change his performance significantly (M=30%), while the modified song intervention (Condition C) increased Ben's independent actions immediately (M=60%). After withdrawing the song, Ben's independent behavior decreased (M=40%)

Re-introducing the modified song intervention (Condition C) produced a high level of independent performance (M=80%). As evaluated in Ben, the song intervention changed the classmates' greeting behavior toward the target child and increased peer interaction. As for the positive outcomes of the interventions, it is apparent that classroom teachers successfully implement interventions based on music therapy principles into the ongoing classroom routine.

FIGURE 1. Mean (M%) of independent responses for Phillip and Ben during the morning greeting routine in each condition of the study.



CASE VIGNETTE: BEN

Since 10 months, three-year-old Ben attended a community-based child-care program five mornings a week. He was diagnosed with ASD and had difficulty transitioning from home to school. Each morning when his nanny brought him to school, Ben held on to her, cried or screamed and ignored any efforts of his teachers to welcome him. His nanny reported feeling "bad" about leaving Ben while he was upset, teachers "dreaded" the arrival of the child, saying things like "it's fine once he's here, but just getting him here is hard," and peers did not take notice of him and went about their play. His Mom and teacher hoped that he would learn to enter the classroom happily and independently, greet his peers during morning arrival time by communicating "hello" in some way, wave "good-bye," and engage in meaningful play.

Both Ben's Mom and his teacher noticed that he was interested in song activities, playing musical instruments, and listening to soft and mellow music. During an interdisciplinary team meeting, Ben's classroom teacher asked about the efficacy of music therapy interventions for Ben's challenging morning transition. The music therapist, familiar with the

child, suggested using a greeting song incorporating the morning greeting routine in use by Ben's classmate. After the team agreed on five specific steps for the greeting routine and identified additional individual education goals, the music therapist composed in close collaboration with the classroom teachers a unique song tailored to the child's challenges, personality, and strengths. Together they worked out how the song intervention will fit into the existing morning routine. The music therapist provided musical training to the teachers and caregiver and modeled how to include Ben and his peers in the morning greeting routine.

When the adults felt comfortable with using the song and Ben's new morning greeting procedure, the teachers implemented the intervention in the ongoing classroom routine. As soon as Ben entered the classroom, his nanny and classroom teachers sang each step of the greeting song to Ben. Ben entered the classroom and looked for a peer to greet by exchange a "hello" picture symbol. His teachers first prompted him to follow each step of the routine and then gradually withdrew their support. Peers began to cluster around him each morning, singing the song and wishing him a "good morning." However, the "good-bye" part was still troublesome to him and triggered undesirable behaviors such as biting and scratching. After consulting with the music therapist, the teacher and caregiver decided that it was too hard for Ben to understand both concepts: greeting and saying good-bye. Therefore they eliminated the good-bye part of the greeting routine and Ben's caregiver left after he entered the classroom smoothly.

On many days Ben now enters the classroom with a smile on his face, joyfully jumps up and down, and vocalizes or names a peer to greet. The song intervention evokes a positive view and interest of peers toward Ben as evident in remarks such as "He doesn't cry anymore," or "He did a great job." Peer interaction frequently continues when Ben plays a hand drum that is offered to him as a toy to play with for the last step of the routine. Furthermore, teachers' and the caregiver's stress level has been reduced due to Ben's smooth transition during arrival time. Ben's Mom is very pleased and satisfied seeing her son's positive development and uses other songs to teach him skills at home.

Experiment II - Multiple Step Task Study

INTRODUCTION

The childcare day is not only filled with transitions, but also with many routines, such as hand washing, toileting, and cleaning up, which are

repeated on a daily time schedule. These routines require children to follow a sequence of steps that typically cause significant difficulty for children with autism (Boswell & Gray, 2003; Williams, 1996). The inability to understand the demands of this classroom routine might cause frustration and confusion, expressed in challenging behaviors. In order to function independently in daily life and achieve group membership, children must learn to understand, remember, and perform the sequence of these tasks.

METHOD

Participants. A three-year old-boy, Andy, diagnosed with ASD (n=1), who had difficulties managing the sequences required for the multiple-step tasks (i.e., hand washing, toileting, and cleaning up independently) was the subject of this study along with his classroom teacher Clara (n=1). The intention of this investigation was to evaluate the effectiveness of songs embedded by the classroom teacher as structural prompts in increasing the independent performance of the target child during these classroom routines and to evaluate whether the musical presentation or the verbal presentation of the sequencing was more effective.

Setting. The experiment occurred in Andy's inclusive childcare classroom. Hand washing and toileting occurred on scheduled times throughout the day and whenever necessary. The classroom was divided in different play areas and contained corresponding toys and materials (Cryer, Harms, Riley, 2003). To cue the children to finish their play activity and transition to circle time, a song for cleaning up toys and materials was used.

Materials. For hand washing the teachers used the already familiar tune "Row your boat" (American Traditional) and expanded the lyrics by including seven steps of the hand washing procedure. For toilet training,

a unique song was written, conveying the demands of the multiple steps for the subject's toilet training. The pre-composed song "Clean-up!" by Barney & Friends (Barney's Favorites Vol. 1, 1992) was used for cleaning-up toys and material after play activities. The teacher used transition objects (i.e., the toy in use) to cue the subject to engage in each multiple step task.

Experimental Design. . Using an alternating treatment design replicated across these three tasks, the effectiveness of the song intervention (Condition A) versus lyric intervention (Condition B) was compared.

Procedure. In the song procedure (Condition A), each particular song for the three selected multiple-step tasks was sung to Andy by the classroom teacher (see Case Vignette: Andy). In the lyric procedure (Condition B), each step of the routine was spoken twice.

Measurements. Six categories of behaviors for each multiple-step task were coded through direct observation using event recording.

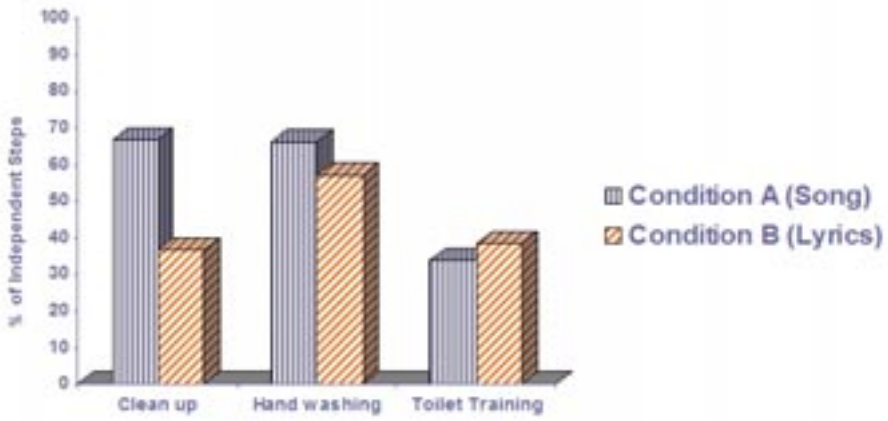
Reliability. Reliability checks were carried out on an average of 44.7% of total observations within each phase and for each multiple step task. The overall interobserver agreement was 96% of the trials.

RESULTS

Results of this study indicate that the implementation of either form of the intervention (song intervention/lyric intervention) was successful in increasing the target child's independent performance for each multiple-step task. However, the song intervention was more effective than the lyric intervention for the hand washing (song intervention M=66% versus lyric intervention M=57.1%) and cleaning-up procedures (song intervention M=66.6% versus lyric intervention M=36.7%), whereas for toileting the lyric intervention (M=38.2%) was slightly more effective than the

song intervention (M=32%). As for the child's positive learning progress, the teacher embeds both forms of the presented sequencing in the ongoing classroom routines effectively.

FIGURE 2. Mean (M%) of Andy's independent steps during the clean up, hand washing, and toileting procedure in each condition of the study.



CASE VIGNETTE: ANDY

Andy was a 3-year old boy with ASD enrolled in an inclusive childcare program. His favorite activities were to identify letters and numbers, listen, dance, and sing to music. Clara, his classroom teacher, said: "Andy really responds well to music. He makes eye contact with me as soon as I start a melody. Singing songs with him during major transitions in the classroom helps him to understand what to do next." However, Andy tended to have difficulties with managing the required steps of classroom routines such as cleaning p his toys after free play. Cleaning up at different times throughout the childcare day was a readily familiar routine for his classmates. Clara found it important to teach children to clean up because it keeps the classroom organized and functional, it signals the transition to the next activity, it communicates concepts of personal responsibility, and it promotes social skills such as helping skills.

Each child is expected to put toys back in the designated play area independently. To make the cleaning-up procedure a more fun activity for her class, she and the children would sing "Clean up" from Barney & Friends while putting toys in the designated area. Clara noticed that Andy stiffened his legs and body, flapped his arms, whined, tried to escape, and avoided cleaning up if she prompted him with words to engage in clean-

ing up. But when she sang the cleaning-up song to him in the same situation, he started to clean up his toys as his classmates did.

Experiment III - Playground Interaction Study

INTRODUCTION

During the childcare day, children spend large blocks of time in outdoor play. The large undefined space, unstructured playtime, and play styles on the playground are highly challenging for children with ASD as measured by the ability to engage in meaningful play and interact with peers. The severe delay in understanding social relationships and communication among children with autism often results in a lack of peer interaction and forming friendships (Danko & Buysse, 2002; Quill, 2001). To ensure that time spent on childcare playgrounds promotes the development of children with ASD, predictable play routines and different play activities that support these children's interests and strengths need to be identified and established.

METHOD

Participants. This investigation involved four boys, ages three to five, diagnosed with ASD (n=4), who displayed a lack of peer interaction on the playground; typically developing children as well as children with other disabilities (n=32); and their classroom teachers (n=6). Two peers for each target child were trained as formal peer helpers. The goal was to improve the target children's interactions with peers and play and engagement on the childcare playground.

Setting. The experiment occurred on the subjects' inclusive childcare playground, which contained different areas of play such as sandboxes, a climbing and sliding structure, a concrete track for riding tricycles, and a Sound Path (Kern & Wolery, 2001).

Materials. A unique song with the intention to increase positive peer interaction and meaningful play and engagement during outdoor play was composed for each target child. In addition, an outdoor music center (Music Hut) with various musical instruments was added to the playground (Kern, Marlette, & Snyder, 2002).

Experimental Design. Using a multiple baseline design across four subjects, the effectiveness of the intervention was evaluated. Procedural fidelity data on teacher and peer task behaviors were recorded as well. Four sequential conditions (Baseline [Condition A]; Adaptation of the playground [Condition B]; Teacher-mediated intervention [Condition C]; Peer-mediated intervention [Condition D]) were implemented for all subjects, except Condition D, in which only three subjects participated.

Procedure. Prior to the construction/availability of the Music Hut (Baseline) the subjects' engaged in playground activities without any instruction. With the adaptation of the playground (Condition B) the subjects were encouraged to play with the instruments on the Music Hut, then left alone. During the teacher-mediated intervention (Condition C), the unique song was sung in the Music Hut by the teachers with subjects and voluntary peers. Teachers trained the formally selected peers to mediate the intervention. The same song was sung by peers buddies and subjects in the Music Hut during the peer-mediated intervention (Condition D). The teacher's support was gradually faded out (see Case Vignette: Phillip).

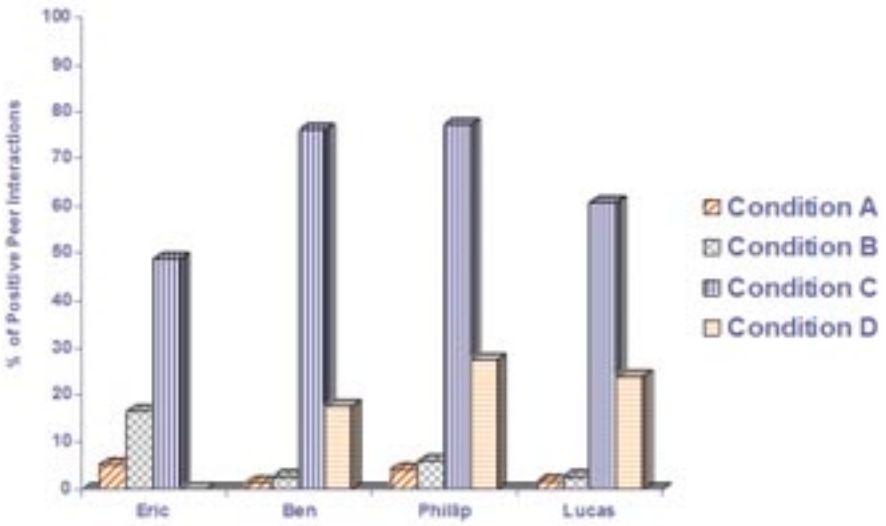
Measurements. Categories of interaction behaviors were coded through direct observation using a 15-second momentary time sampling recording procedure.

Reliability. Reliability checks were carried out on an average of 36.8% of total observations within each phase and for each child. The overall interobserver agreement was 98.2%.

RESULTS

Results of this study suggest that prior to the musical adaptation of the playground, the targeted children had few positive peer interactions on the playground (M=3.2%). The musical adaptation of the playground enhanced positive peer interactions slightly but not significantly (M=7.1%). The teacher-mediated intervention resulted in an immediate and significant increase in positive peer interactions (M=66.2%). With the exception of one teacher, the teachers were observed to have a high ability to implement the intervention (M=84%). Peers participated and modeled the tasks on a high level (M=85.3%). Peer interaction, meanwhile, decreases during the peer-mediated intervention (M=21.1%) but significantly improved compared to both the playground adaptation and especially the baseline. Play and engagement increased significantly for three subjects and remained the same over conditions for one subject.

FIGURE 3. Mean (M%) of positive peer interactions for each target child by each condition of the playground study.



CASE VIGNETTE: BEN

Since 10 months, three-year-old Ben attended a community-based child-care program five mornings a week. He was diagnosed with ASD and had difficulty transitioning from home to school. Each morning when his nanny brought him to school, Ben held on to her, cried or screamed and ignored any efforts of his teachers to welcome him. His nanny reported feeling "bad" about leaving Ben while he was upset, teachers "dreaded" the arrival of the child, saying things like "it's fine once he's here, but just getting him here is hard," and peers did not take notice of him and went about their play. His Mom and teacher hoped that he would learn to enter the classroom happily and independently, greet his peers during morning arrival time by communicating "hello" in some way, wave "good-bye," and engage in meaningful play.

Both Ben's Mom and his teacher noticed that he was interested in song activities, playing musical instruments, and listening to soft and mellow music. During an interdisciplinary team meeting, Ben's classroom teacher asked about the efficacy of music therapy interventions for Ben's challenging morning transition. The music therapist, familiar with the child, suggested using a greeting song incorporating the morning greeting routine in use by Ben's classmate. After the team agreed on five specific steps for the greeting routine and identified additional individual education goals, the music therapist composed in close collaboration with the classroom teachers a unique song tailored to the child's challenges, personality, and strengths. Together they worked out how the

song intervention will fit into the existing morning routine. The music therapist provided musical training to the teachers and caregiver and modeled how to include Ben and his peers in the morning greeting routine.

When the adults felt comfortable with using the song and Ben's new morning greeting procedure, the teachers implemented the intervention in the ongoing classroom routine. As soon as Ben entered the classroom, his nanny and classroom teachers sang each step of the greeting song to Ben. Ben entered the classroom and looked for a peer to greet by exchange a "hello" picture symbol. His teachers first prompted him to follow each step of the routine and then gradually withdrew their support. Peers began to cluster around him each morning, singing the song and wishing him a "good morning." However, the "good-bye" part was still troublesome to him and triggered undesirable behaviors such as biting and scratching. After consulting with the music therapist, the teacher and caregiver decided that it was too hard for Ben to understand both concepts: greeting and saying good-bye. Therefore they eliminated the good-bye part of the greeting routine and Ben's caregiver left after he entered the classroom smoothly.

On many days Ben now enters the classroom with a smile on his face, joyfully jumps up and down, and vocalizes or names a peer to greet. The song intervention evokes a positive view and interest of peers toward Ben as evident in remarks such as "He doesn't cry anymore," or "He did a great job." Peer interaction frequently continues when Ben plays a hand drum that is offered to him as a toy to play with for the last step of the routine. Furthermore, teachers' and the caregiver's stress level has been reduced due to Ben's smooth transition during arrival time. Ben's Mom is very pleased and satisfied seeing her son's positive development and uses other songs to teach him skills at home.

Discussion

This cumulative study was designed to evaluate the effects of embedded music therapy interventions using songs and an outdoor music center on the performance of young children with autism during daily routines in an inclusive childcare program. It also examined teachers' ability to implement the interventions after receiving training, and the effective-

ness of peer-mediated strategies to increase interactions on the playground.

The series of studies provided the following findings. Individualized music therapy interventions were effective in increasing the independent performance of the children within their childcare program. These findings are consistent with the reports from numerous formal and anecdotal case studies in music therapy, in which interventions were applied to improve core difficulties in children with autism in self-contained settings (e.g., Allgood, 2002; Alvin & Warwick, 1991; Brownell, 2002; Edgerton, 1994; Gustdoff & Neugebauer, 1997; Nordoff-Robbins, 1977; Schuhmacher, 1999; Snell, 2002; Wimpory et al., 1995). However, this study expanded upon previous studies in the field by showing that acquisition of social and adaptive skills occurs when the interventions are embedded within the daily routines and events. Further research should investigate if music therapy interventions embedded in daily routines can facilitate the development of other skills and if they are beneficial to children with special needs other than autism.

Songs are a powerful means of conveying therapeutic goals. In eight of nine cases, the songs produced desirable outcomes. These findings support current practice with children with autism (Baker, 1992; Cole-Currens, 1993; Furman, 2001; Gottschewski, 2001; Williams, 1996) and provide evidence that greeting songs can be effective during difficult separations from caregivers. They also replicate earlier studies in which music was used to facilitate memorization of sequences (Gfeller, 1983; Jellison & Miller, 1982; Wolfe & Horn, 1993), as well as to improve social skills (Stevens & Clark, 1969; Brownell, 2002). However, previous studies did not examine the use of songs with children with autism for transitioning and memorization of multiple-step tasks, nor did they take place in an inclusive childcare program. Since the three studies were

not comparison studies, it is not known if other songs or other interventions would have been equally effective or more so. Only the multiple-step tasks study provided evidence that the songs were more effective than the verbal presentation of a sequence. More studies are needed that compare the effects of a variety of songs and other interventions on the behavior of young children with autism.

The musical adaptations of the playground facilitated the involvement and motivation of children with autism to interact with peers. However, the combination of the musical playground equipment and individualized interventions are needed to obtain the desired outcomes. This is consistent with findings in another study of playground modifications (Kern & Wolery, 2001, 2002) and is described in the literature (e.g., Dunst et al., 2001; Nabors et al., 2001; Sandall, McLean, & Smith, 2000; McWilliam, 1996, 2000a, 2000b; Wesley, 2004). That is, environmental adaptations and teacher-mediated interventions are often necessary to meet the children's learning needs. In general, playgrounds need to be seen as educational/ therapeutic environments. More studies that apply music therapy on playgrounds, both to children with and without disabilities, are needed.

A music therapy collaborative consultative approach is effective in enabling teachers to implement interventions based on music therapy principles successfully in daily classroom and playground routines, when staff development activities and ongoing consultation is provided. This replicates and expands upon earlier studies showing that teachers can effectively implement interventions related to other disciplines in ongoing activities when support is provided (Garfinkel & Schwartz, 2002; Sewell et al., 1998; Venn et al., 1993; Wolery et al., 2002). However, in previous studies, interventions were not based on music therapy. Furthermore, there is a correlation between correct implementation and the tar-

get children's skill improvement. Effective staff development activities and ongoing collaboration are critical components for appropriate and successful implementation of teacher-mediated interventions based on music therapy. Although there are many ways of providing therapeutic services in early intervention, the collaborative consultative model of service delivery is desirable. It leads to more comprehensive and holistic interventions, and incorporates recommended practice and policy in early intervention. More research explaining the effectiveness of a music therapy collaborative consultative model of service delivery in the child's natural environment is needed.

Overall, music therapy interventions broaden social experiences of young children with autism. Peer-mediated strategies, as used in Experiment III, were effective in increasing peer interactions and meaningful play on the playground. At the same time, the interventions facilitated the positive involvement of young children with autism in group-oriented activities and provided solid foundations for developing friendships with peers.

Finally, this study demonstrates the potential benefits of a cumulative case study design for music therapists working in early intervention. Single case designs enable us to evaluate clinical practice and consultation with other professionals, and to ask important questions about the practices and principles of music therapy in a quantitative and experimental way. However, single-case experimental designs are limited by the small number of participants. In order to generalize, replication with multiple participants is warranted. Nonetheless, this series of studies intended to be a contribution to establish music therapy as a widely recognized related service in Early Intervention/Early Childhood Special Education.

Conclusions

This cumulative case study supports the contemporary model of service delivery in early intervention/early childhood special education, and shows that music therapy interventions can be meaningfully embedded in ongoing classroom activities and routines. The music therapy collaborative consultative approach was effective in enabling teachers to implement the interventions successfully. Through individualized song interventions, children with autism acquired and improved skills and social interactions with peers in the natural environment. The involvement of children with and without disabilities in music provided opportunities for establishing friendships.

Collaborative consultation, widely employed elsewhere in early intervention/early childhood special education to promote program sustainability, is an appropriate and effective way of providing music therapy treatment. Indeed, it allows for the expansion of music therapy services. Overall, music therapy enhances services for young children with autism. However, training of music therapists in collaborative consultative methods of service delivery, along with continued research into the effects of embedded music therapy interventions in inclusive childcare programs, is warranted.

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This article can be cited as: Kern. P. (2004) Making friends in music: including children with autism in an interactive play setting. Music Therapy Today (online) Vol. V, Issue 4, available at http://musictherapy-world.net