

Supplementary Materials

Serenade Parent-Child Music Class Program

Serenade is a 12-week parent-child music class program, led by a board-certified music therapist, that provides music-based parent training and peer interaction in a musical play context following a manualized curriculum.³⁸ During Serenade’s weekly class sessions, groups of 4–6 families (~half with child with ASD) participate in joint music making activities that are designed to facilitate children’s engagement while also teaching parents behavioral strategies to promote children’s social engagement and positive behavior. Each week of the program is focused on a different theme targeting the use of specific musical strategies, with families receiving weekly handouts on the topic (see Supplementary Table 1). Over the course of the program, families develop a “musical toolbox” of parenting strategies. At the start of the program, families receive audio recordings of the songs, access to video models of song activities used in class, a class social story, and a class visual schedule (also used during class). Throughout the class, visual supports, behavioral reinforcement, and prompting strategies are used to support all children’s participation, which also models the use of techniques for parents.

The Serenade music class format and sample session activities have been described previously³⁸ (see Supplementary Table 2). Each class involves a warm-up period during which children engage in free play while the music therapist leads parents in a discussion of their home practice goals and introduces the theme for the week. The music therapist then leads families in ~30-40 minutes of ~eight structured group music activities, throughout which the therapist demonstrates and provides instruction on ways in which the music activities connect with the session theme. The song activities provide opportunities for practicing specific parenting strategies (e.g., following child’s lead, animacy, positive reinforcement) to support children’s

social interaction and behavior (e.g., attending to others, imitation, turn-taking). Variations in song activities are introduced over successive classes by modulating pacing, types of song movements and gestures, incorporation of props/instruments, and adding new verses and songs. At the end of each class, the therapist reviews the theme and families set individual goals for at-home practice. All families participate in all class aspects such that the program incorporates aspects of community music classes, parent training/psychoeducation, and parent support groups. The music therapist is supported by ~two research assistants who provide behavioral or technical support (e.g., video cameras) as needed.

The classes were videorecorded with four cameras, one in each corner of the room, which were combined into a single video for offline behavior coding of child engagement (see Main Text). Child behavior was coded for all song activities except for the book and lullaby activities (see Supplementary Table 2) because different books provided different opportunities for movement/singing and because children were not expected to actively move or sing during the lullaby.

Supplementary Table 1. Weekly Themes of Serenade Parent-Child Music Class Program

1. Using Music to Support Social Interaction	7. Modeling and Modulating Emotions with Music
2. Capturing your Child’s Attention with Music	8. Promoting Turn-Taking and Making Choices through Music
3. Music for Imitation and Communicative Gestures	9. Music for Pretend Play and Imagination
4. Promoting Speech and Language Skills with Music	10. Expanding to New Routines
5. Music as Behavioral Reinforcement	11. Exploring New Musical Contexts
6. Music for Redirection and Transitions	12. Music for Peer Interactions and Games

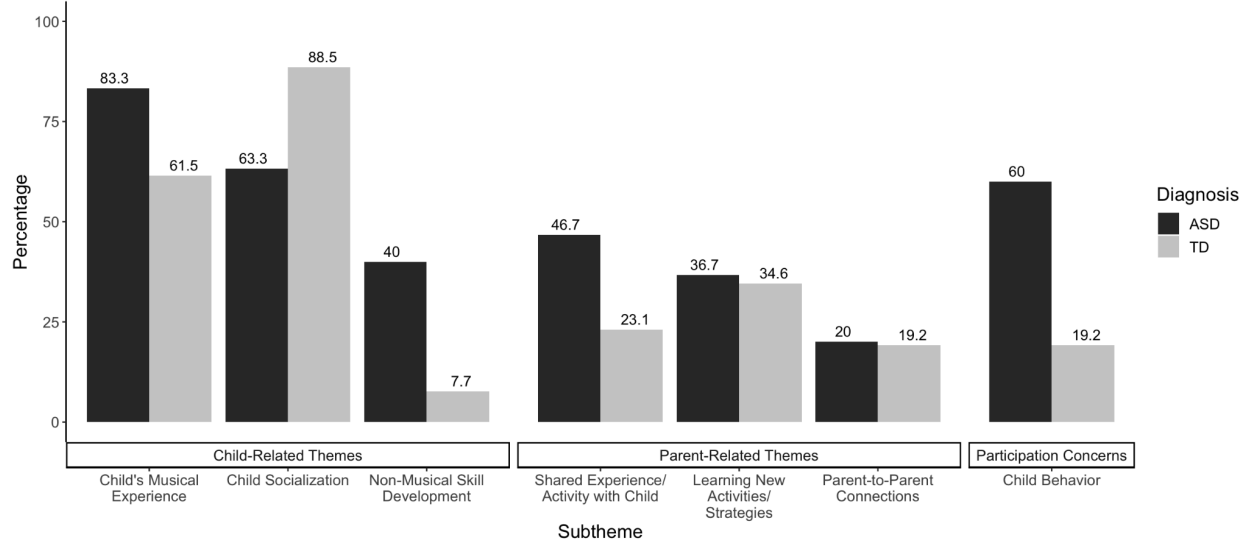
Supplementary Table 2. Serenade Class Activities and Examples of Variations on Song Activities for Session Themes

Session Activity and Songs	Session 3. Music for Imitation and Communicative Gestures	Session 7. Modeling and Modulating Emotions with Music
Check-in and discussion of at-home practice and goal from prior session. Introduce theme for the current session.		
Music-Making Activities:		
Greeting Routine: <i>Hello Song</i> (original)	Wave hello	Model smiling. As appropriate to child’s developmental level, label child’s emotion or ask child how they are feeling.
Small Body Movements: <i>Rum Sum Sum</i> (traditional)	Imitate hand gestures used in the song	Modulate the tempo, volume, and energy of the song and connect to emotional states.
Large Body Movements: <i>We are the Dinosaurs</i> (The Laurie Berkener Band); <i>Fire Truck</i> (Ivan Ulz)	Imitate large body movements and song-associated gestures	Contrast verses of song for energetic marching movements versus resting movements.
Turn-Taking/Choices: <i>Flower Shop Song</i> (traditional; the type of shop and associated props change throughout sessions); <i>In Our Band</i> (by Adam Summers)	Point to a choice board to choose a flower; imitate gestures with flower prop (e.g., smell flower)	Choose musical instruments during song; play musical instruments in different ways (loud/fast vs. quiet/slow)
Movement/Emotions: <i>Happy and You Know it</i> (traditional)	Imitate body movements (traditional song movements and new movements)	Practice emotions and coping strategies through song lyrics and movements (e.g., happy → clap hands; sad → get hug)
Book+Song (varied): Examples include <i>Brown Bear</i> by Bill Martin Jr; <i>Octopus (Slippery Fish)</i> by Charlotte Diamond	Point to pictures in book. Point to classmates to choose whose turn it is	Engage in movements and emotional facial expressions appropriate to song lyrics
Calming routine: <i>Lullaby</i> (varied). Examples include familiar nursery rhymes, original songs, and lullaby versions of popular songs	Incorporate gestures in song (e.g., hand movements to <i>Twinkle Little Star</i>)	Soothing lullaby routine (e.g., singing + rocking child) to a lullaby version of a popular song (demonstrating how can modulate any song to be a calming lullaby)
Goodbye Routine: <i>Goodbye Song</i> (original)	Wave goodbye	Model smiling. As appropriate to child’s developmental level, label child’s emotion or ask child how they are feeling.
Review session theme and provide handout to parents about theme. Parents set individual goal related to theme for at home practice.		

Table adapted from ³⁸.

Supplementary Figure 1. *Themes Endorsed by Families at Pre-Interview (1a) and Post-Interview (1b)*

1a) Pre-Interview Themes



1b) Post-Interview Themes

