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The Effects of Parent-Child Interactive Music Therapy on Sentence Verbalisation in a Child with Autism Spectrum Disorder: A Case Study

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Abstract

This study examined the effects of parent-child interactive music therapy on sentence verbalisation in a child with Autism Spectrum Disorder (ASD) and was conducted via a case study design. The participants were a boy with autism spectrum disorder and his mother. The child and his mother attended interactive music therapy sessions that provided singing, instrument playing, songwriting, and movement. Twelve sessions were conducted during this study consisting of two initial assessments and 10 intervention sessions. The initial assessments determined the child's behaviour while in an environment with music and his preferred music. The intervention sessions consisted of two parts to enhance the child's sentence verbalisation. The first part aimed to teach and assess words through pre-composed songs. The second part aimed to motivate the child's sentence verbalisation using one selected song and measured the verbalisation score using a verbalisation rating scale. The results showed the effectiveness of parent-child interaction on the child's ability to focus on verbalisation through a combination of singing and movement activities. The child's verbalisation was clearer and more accurate after attending singing activities with his mother as she held the child in her arms and together engaged in physical interaction. His average verbalisation score increased from 1.33 to 3, presenting an improvement of his verbalisation from verbalising single words to verbalising three-word sentences that included a subject, verb, and object.

Keywords: Autism spectrum disorder, interactive music therapy, parent-child interaction, sentence verbalisation

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder indicated by two main characteristics: 1) social communication/interaction, and 2) restricted, repetitive patterns of behaviors, interests and activities. The symptoms of ASD vary between individuals hence the term 'spectrum', and begin to emerge during a child's developmental period (American Psychiatric Association, 2013). Children with ASD may have poor communication skills and struggle to interact with other people. They may have difficulty in using and understanding language, find it challenging in holding or initiating conversation while some children are non-verbal. There may also be a deficit in paralinguistic behaviours such as a lack of eye contact, gestures, body

language, and facial expressions. Children with ASD are inflexible in changing in their daily routines and they may exhibit a repetitive use of language, speech, gestures, or have fixed interests. Some of children also have hyper -or hypo -activities to sensory input (APA, 2013; Autism Society, 2017; Benson, 2016; CDC, 2018).

Most children with ASD have severe levels of communication and language problems (Trangkasombat, 2007). Some may be able to verbalise words to communicate but some of them are non-verbal (i.e. they use no spoken language or very few words). Children with ASD who are able to use verbal communication may have delayed language and speech development which presents difficulty in using and understanding language depending on each child's intellectual and social development. Children with ASK tend to use inappropriate words and phrases, use abnormal speech, lack comprehension of language and meanings, and most tend to use single word verbalisation (APA, 2013; Trangkasombat, 2007; Wright, 2013).

Verbalisation is verbal communication using language to communicate, including speech and singing, which is indicated in the Individualised Music Therapy Assessment Profile (IMTAP) in four levels (Baxter, Berghofer, MacEwan, Nelson, Perters, & Roberts, 2007). The first level is 'overall are intelligible' using any verbal communication to be understood. The second level is 'verbalises single word' which is verbalising any one word to communicate. The third level is 'verbalisations are of phrase length' which is verbalising any utterances of two to three words in length to communicate. And the fourth level is 'verbalisations are of sentence length' which is verbalising any three to six words to create sentences to communicate (Baxter et. al., 2007). The treatments for verbalisation problems are various including receiving Speech-Language Therapy (National Institute on Deafness and Other Communication Disorders, 2018), using Augmentative and Alternative Communication (AAC), and participating in Music Therapy (Davis et al., 2008; Kern & Humpal, 2013).

Music therapy is one of the treatments for children with ASD who struggle with their communication skills. Qualified music therapists use music intervention to enhance an individual's non-musical skills through music activities such as listening to music, singing, playing instruments, composing, analysing, and moving with music (American Music Therapy Association, 2007; World Federation of Music Therapy, 2011). Research studies have found the effectiveness of music therapy intervention in children with ASD including improvements in social and communication skills, behaviour, as well as in emotional, physical, academic, and leisure skills (Davis et al., 2008). Improving communication skills is one of the primary goals of music therapy professionals for children with ASD (Kaplan & Steele, 2005). The studies found that music is a form of communication and influences communication (Gfeller, 2002; Davis et al., 2008). Music can be used to express emotional messages and information in the same way as speech (Silverman, 2008). Lim (2010) observed the effects of music intervention on speech production. Farmer (2013) observed the improvement of spontaneous communication in children with ASD and Perry (2003) noticed the effectiveness of improvisational music therapy on interaction, joint attention, and on initiating communication in children with ASD. Moreover, Lee and Ho (2018) observed the effectiveness of the holistic music education approach using sound beam trigger modes on the development of communication skills by young children with ASD.

In Thailand, Chiengchana (2014) found the effects of Kodaly-based music experiences on social communication responses in children with ASD .The results of this study indicated that Kodaly-based music experiences could enhance social communication in children with ASD. Kawinnithiporn, Chiengchana, and Tayrattanachai (2018) examined the effects of music therapy on expressive communication skills in a child with ASD through seven categories including: 1) fundamentals, 2) non-vocal communication, 3) vocalisations, 4) spontaneous vocalisations, 5) verbalisations, 6) relational communication, and 7) vocal idiosyncrasies. The results of this study indicated that the participant increased expressive communication behaviour and decreased vocal idiosyncrasies. Positive behaviours were more stable during music therapy intervention than the baseline. From the studies mentioned, it can be summarised that music therapy is used to improve communication skills of children with ASD such as speech production (Lim, 2010a), spontaneous communication (Farmer, 2013), communication initiation, and communication behaviour (Chiengchana, 2014; Perry, 2003; Kawinnithiporn, Chiengchana, & Tayrattanachai, 2018).

Interventions by music therapy professionals cover many approaches from different schools. One of the approaches applied to children with ASD is interactive music therapy. This approach focuses on interactions between the parent, child, and music therapist based on a music therapy improvisational model. Oldfield (2006) described that interactive music therapy can make an environment safe for children and encourages their

emotional expressions, communication skills, and interactions. Parents are included in the sessions together with their child with a music therapist who participates in music-making and interacting with the child. During the session, music activities are provided by a music therapist including music-making, which can be performed by singing and instrument playing. Activities also include the use of song stories that can enhance parent-child engagement and self-confidence, and action songs that involve moving through a music activity by increasing physical interaction between a parent and a child. After each session, parents also have to discuss and reflect on their child's changing behaviour with the music therapist (Oldfield, 2006). Oldfield showed that interactive music therapy can enhance the parent-child relationship and communication, and is shown to be effective for children with ASD on verbal and gestural communication skills while enhancing the relationship between children and their families (Oldfield, 2006; Oldfield, 2006a; McIntyre, 2009). To support the parent-child interaction in music therapy sessions, studies found that parents are the primary partners to their children. Parents can support children in every developmental area such as language, communication, cognitive skills, and social skills development through the quality of relationship and interactions between parents and their children (Kern & Humpal, 2013; Pasiali, 2012; Raising Children Networks, 2017; Yang, 2016). Moreover, evidence on music therapy has shown that family-centered music therapy focusing on parent-child interaction improves the quality and quantity of a child's development. Parents who participate in music therapy intervention can support their child's social, communication, and cognitive skills development (Yang, 2016).

Based on the literature review above there are no studies that focus on utilising interactive music therapy to facilitate sentence verbalisation in children with ASD using Thai language specifically. The aim of this study is to examine the effects of parent-child interactive music therapy on sentence verbalisation in a child with ASD in Thai language using the case study design. Research questions include: 1) Does parent-child interactive music therapy enhance sentence verbalisation in children with ASD, and 2) How does parent-child interactive music therapy enhance sentence verbalisation in children with ASD?

Methodology

This research employed the qualitative case study approach to discover how interactive music therapy based on parent-child interaction can encourage a child with ASD to verbalise a sentence.

Participants

The participants in this study were volunteers: a five-year-old boy and his mother who was interested in music intervention. The child was diagnosed with autism spectrum disorder with deficits in social communication, behaviour, and attention span. The boy verbalised single words in the Thai language with utterances such as *perd* (open), *pid* (close), *kin* (eat), *len* (play), or the name of objects. When he did not know certain words for objects, he held his mother's hand and brought her to those objects. The boy had no hearing impairment indicated from the medical report, had not undergone any music therapy prior to this study, and was not attending speech therapy sessions during the music therapy phase in this study. Through his parent's permission the boy gave his consent to participate in the study. The mother was the main caregiver and is the one person who stays with the child 24 hours a day and therefore was the person best known to the boy. The mother had no hearing impairment as indicated in the medical report, uses the Thai language; and agreed to sign a consent form.

Interventions and Procedures

This study consisted of 12 music therapy sessions comprised of two initial assessments and 10 intervention sessions. The two initial assessments as the first two sessions were approximately 30 – 40 minutes each. The music therapist provided music therapy sessions to assess the child's and the parent's preferred music, behaviour, and ability in various areas such as communication, social interaction, emotion, physical, and response to music.

The intervention was comprised of the ten sessions, twice per week, held for a five week duration, and

were approximately 40 – 50 minutes per session. This phase was divided into two parts: the first part was provided in the first to fifth sessions. The music therapist presented five songs to the child and looked for his response to each of the words and songs. Then, the most responsive song for the child would be selected to use in the session in the following part. In the second part that included session numbers six to ten, the selected song would be repeated in all sessions to enhance the child's verbalisation in sentences.

All of the sessions were conducted at the Music Therapy Department, College of Music, Mahidol University, located in Thailand's Nakhon Pathom province. The researcher served as the music therapist, assumed the responsibility of providing all music therapy sessions and used interactive music therapy as the main intervention. In the sessions, the music therapist provided music activities including music making, song stories, and action songs based on an Oldfield's interactive music therapy approach (Oldfield, 2006). The music therapist also used greetings and farewells. Overall evidence showed that these activities could increase communication skills as follows:

Table 1

Interactive Music Therapy Activities

Activities	Evidence-Based
Music making - singing - instrument playing	Singing is an opportunity to motivate the need for communication and expression with verbal and non-verbal communication. Communication was activated when singing within groups which was the natural environment for interacting and communicating as the form of communication (Davis et al., 2008; Lim, 2010a; Kern, Wolery, and Aldride 2007). The music elements of songs were evident in that melodies enhanced children's ability to remember and recall more information and sentences of lyrics (Colwell, & Murlless, 2002) and phrases of songs were a structure and stimulation to verbalise and motivate children to complete certain phrases (Davis et al., 2008). And instrument playing could also provide the opportunity for self-expression and communication (Schulberg, 1981).
Song stories - songwriting	Songwriting provided verbal expression and self-confidence for children with ASD to initiate communication and verbalization (King, 2004; Oldfield, 2006) by leaving blanks to motivate children to complete the sentences and express their thoughts (Davis et al., 2008).
Action song - movement with music	Used for increasing physical interaction, social interaction, and relationships between parents and children which increased children's social and communication skills (Oldfield, 2006). The children also learn sentences that were related to movement (Davis et al., 2008).

In this study, singing was the main activity whereby all participants would sing together in a group. The music therapist acted as a facilitator to promote parent-child interaction. The facilitator used live music improvisation, music preferences, and pre-composed songs. Five music therapists' pre-composed songs comprised continuing and repeating melodies and simple lyrics using familiar words and sentences in the context of daily life. The time signatures of all the songs were 4/4 with simple rhythmic patterns of whole notes, half notes, quarter notes, and eighth notes in the C major key for assessing the familiar sentences of a child. One of these songs was selected to motivate the child's sentence verbalisation. The instrument that was played was sometimes used to accompany singing. Song writing was provided with singing and movement in order to encourage the child to express his thoughts and needs by leaving blanks in the songs. Movement was used to

follow the child's behaviours using free or specific movement, and sometimes used to accompany singing or song writing.

Before each session started, the music therapist gave details about the session to the parent and described step-by-step about music interventions and songs. The music therapist also discussed the role of the parent especially with regard to appropriate ways to interact with the child while he was feeling a particular way, and showing how to give cues and rewards. During the music therapy session, the music therapist presented the music interventions as described to the parent and provided opportunities for the parent to interact with the child by using songs and musical cues. The music therapist served as a model for the parent to follow the child's behaviours, vocalisations, and actions. After each session, the music therapist reflected with the parent and advised the parent regarding beneficial home activities. Later, the music therapist observed a videotape of the child's verbalisations and interactions two times after each session, and noted observations and collected data.

In terms of dependent measures, the music therapist used a sentence verbalisation rating scale to evaluate the child's verbalisation. This rating scale was created by the music therapist using the idea of the Individualised Music Therapy Assessment Profile (IMTAP) verbalisation domain. The verbalisation rating scale was applied using three sub-items of verbalisation: 'verbalises single words', 'verbalisations are of phrase length', and 'verbalisations are of sentence length' in order to make a thorough six point-criteria of the child's verbalisation. Zero points were given to the child when he did not speak any words with prompts; one point for speaking one word with one prompt; two points for speaking two words with one prompt; and three points for speaking three words with one prompt between each word. For example, if the child spoke his name at the beginning of the sentence but did not speak any following words, he needed prompts to complete the sentence; four points for speaking an entire sentence with one prompt at the beginning; and five points for speaking an entire sentence completely by himself without any prompts. The summary of these verbalisation points is shown below:

0 = No words with prompts
1 = One word with one prompt
2 = Two words (verb + object) with one prompt
3 = Three words (subject + verb + object) with one prompt between word
4 = Three words (subject + verb + object) with one prompt at the beginning
5 = Three words (subject + verb + object) with zero prompts

After finishing the research study all information that could be used to identify the participants was deleted from all data storage.

Results

The Results of Initial Assessment

During the initial assessment, the music therapist found that the child had a short attention span and demonstrated behavioural problems such as running, screaming, and shouting. He was not interested in any musical instrument but he sang words of his favourite songs in Thai language. The child could follow the actions of the song, "If You're Happy and You Know It", by clapping his hands simultaneously with his mother's hand clapping as well as hugging and dancing. However, without the songs he would try to leave and the mother would have to command him to do what she wanted. The child was able to say words that came from his own thoughts without being guided from the researcher or his mother. These words made sense in the context of the sentences and the child was able to sing the last phrase of his favourite song. When the music therapist improvised a song or sang other songs that the child did not know, he remembered those songs quickly and was able to sing the last words of those songs.

The Results of Interventions

In the first part of the study, the observations showed that the child responded with four words that were provided by the music therapist: "*kao*" (rice), "*hong-nam*" (toilet), "*lotus*" (name of a department store), and "*eek*" (more). He said these words at the end of each song when the music therapist and the parent gave him a cue. The child still used single words in this part but the word that he most responded to and usually spoke clearly was *hong-nam* (toilet). This result matches up to the mother's report that the most effective song for the child was the, "*Chan Pai Hong-Nam*" ("I Go to the toilet") song. He said this phrase at home when he wanted to go to the toilet which he never did it before. Therefore, the music therapist selected this song to use in the second part of the study .

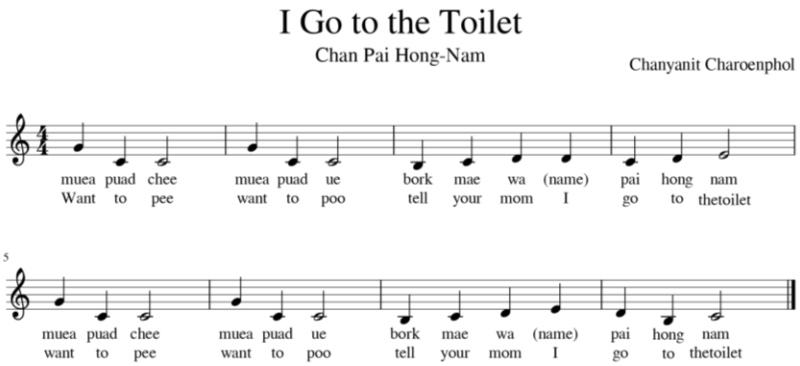

Figure 1. "I Go to the Toilet" song with Thai lyrics (in the first line) and English lyrics (in the second line)

In the second part, the child received average points at 1.33, 1.83, 2, 2, and 3 in the verbalisation rating scales (*Figure 2*. Verbalisation averaged point). The child developed his verbalisation from a single word, *hong-nam* (toilet), to (name) "*pai hong-nam*" ("I Go to the toilet") with prompting that could be supported by the verbalisation rating scales and observation. From observations, the child developed his speaking in sentences from two words to three words with one prompt. In the sixth session, the child continued to consistently say the two-word phrase "*pai hong-nam*" ("I Go to the toilet"). In the seventh and eighth sessions, the child always spoke two-word phrases and started saying his name at the beginning on one occasion but had to be prompted to finish saying the following words. In the ninth session the child continued to say a two-word phrase and he was also able to say a complete sentence by himself with the researcher's prompt at the beginning of the session. In the tenth session, the child was able to say an entire sentence approximately 50 percent of the time and also spoke two-word phrases as usual.

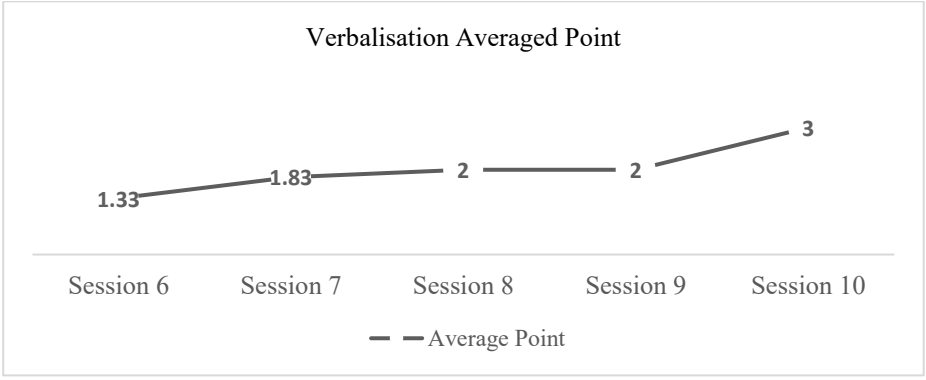

Figure 2. Verbalisation averaged point

The study observations demonstrated that parent-child interaction in parent-child interactive music therapy positively affected the child's focus on verbalisation. When the child was supported by the music

therapist's music and his mother's physical interaction such as hugging, dancing, and riding on her back, he focused more on verbalisation. He usually looked at the music therapist (who was also the singer at that time) and said song words or sentences correctly and clearly. This was different from the child's attempts to say words on his own where he did not focus on what he was listening and singing to. The child was more engaged in the music and singing when music was synchronised to his emotional dynamics and physical movements. The sudden stop with dominant seventh chord gave musical cues to the child and motivated him to sing from that point until the end resulting in longer sentences. Thus, it can be summarised that musical support and physical interaction did encourage the child with sentence verbalisation. He could sing (name) "*pai hong-nam*" ("I go to the toilet"), (name) "*kin kow*" ("I eat rice"), "*aou eek*" ("want more"), and other words through songs during music therapy sessions. Apart from that, the child exhibited better speech production while saying the word "*pai*" ("go"). It can be concluded that the child was comfortable saying "*pai*" ("go") consistently after attending music therapy sessions.

The study observations also showed that the mother played an important role in the child's responses. When the child was very agitated, he ran and screamed all the time and if the mother ordered her child to do what was expected during the activities, he would not respond to her. If the mother tried not to be too commanding with the child and interacted with him by hugging, dancing, and letting him ride on her back, the child calmed down and stayed with her in the moment that they were interacting together. If the mother tried to follow the child's directions using the iso-principle technique, it would make the child respond better and focus more on the activities.

From the interviews, the parent also reported that there was a big difference in the child after attending parent-child interactive music therapy sessions. The child began to initiate communication with his mother when he wanted to express his needs. He could tell his mother different words as if it was normal even though that he had never said certain words before. It was easier for the child to speak and answer questions correctly in different situations and he started to speak longer sentences. However, although the communication domain had improved, his behaviours did not change. Nevertheless, music and the interaction between the parent and the child helped him calm down.

Discussion

Overall, the results showed an improvement in the child's sentence verbalisation after the parent and child participated in the interactive music therapy sessions. Parent-child interaction promoted the child's attention during each activity and he calmed down from running and shouting when the parent hugged him. This is related to Bunt and Pavlicevic (2001) who described that interaction between parents and the child created a safe environment for children. Kaenampornpan (2005) also reported that music therapy could support interaction between parents or other caregivers, and children while creating a safe place for children to interact with others. This study verifies that a parent is an important person in supporting a child emotionally as well as help develop communication and social skills. During his study while the child was held in his parent's arms, he paid attention and focused more on the activities and he also demonstrated clearer and more accurate speech production than usual.

In this study, improvement in verbal communication was shown when the parent and the child interacted together. This observation is affirmed by *Raising Children Networks* (2017) and Yang's (2016) statement that, parent-child interactions are important for supporting children in terms of language, communication, cognition, and social skills. In the study the Thai child was able to develop his speech production and pronunciation including saying his name and the word *pai* (go), which were clearer to listen to and understand compared to previous attempts. This result matched up to Lim's (2010a) study, where Lim found positive outcomes of speech production in children with autism spectrum disorder by using music for speech training. In Lim's study, the child demonstrated quicker verbal responses when the parent talked and asked him some questions. This observation is associated with Seybold (1974) who stated that singing affected delayed language speech (Schulberg, 1981) and the child showed longer lengths of verbalising in the singing activity when prompts were given in the phrases that motivated him to speak at a longer length. Prompts or cues that the parent and the music therapist gave the Thai child in this study helped him to know his cues and tasks so that he could achieve the expected goals. This observation is related to Kern & Humpal (2013) who described

that prompts help children to achieve a given task.

The pre-composed songs used in this study had a simple melody and repeated lyrics as discussed in Davis et al. (2008) that repeating lyrics and melodies promoted remembering song information by people with autism spectrum disorder. Colwell and Murlless (2002) also stated that singing a melody enhanced children's ability to remember and recall lyrics or information about songs. In our Thai study, the results show that the child remembered the song lyrics and was able to sing words from the first session. Furthermore, rhythmic patterns in songs were consistent and also repeated, which is related to Thaut, Hurt-Thaut, and LaGasse (2008) who stated that this method helps participants in speech self-regulation. The results in the present study show that the child sang in a continuous rhythmic pattern when the music stopped at a certain phrase of the songs. The child was able to initiate communication by verbally expressing his needs. For example, the child told his mother that he wanted to go to the toilet by himself which is a verbal utterance he had never expressed prior to this study. This result can be described by King (2004) in that music creates a structure of time and enables the child do the same thing that is communicated in the music. This structuring of time enables children to learn what they should do which relates agian to Kern and Humpel (2013) who stated that using music therapy in real life situations can promote children's general skills. All of the results can be related to Davis et. al. (2008) that music and speech share a similar form of communication and encourages expressive and receptive communication.

Conclusion

The findings of this study showed the effectiveness of parent-child interactive music therapy on sentence verbalisation in a Thai child with autism spectrum disorder. The child developed better sentence verbalisation from verbalising a single word to verbalising utterances three words in length. The child gained 1.33 verbalisation points in session number six which then rose to a score of 3 points in the last session. Apart from sentence verbalisation, the child's pronunciation, response, and phrase lengths also improved and he was able to initiate communication correctly at home. During the music therapy session, the parent strongly influenced the child's attention in the activities. Including the parent in the session made a safe place for the child. The activities that allowed parent and child to interact together such as hugging, dancing, and riding on the parent's back that enabled the child to hold his attention for a longer time and improved his focus on music activities. The child paid attention and focused on singing phrases and words in songs because of his interaction with his parent along with musical support from music therapist. With these two adult influences, the child sang words and phrases on cue better than when he played alone. Singing preferred songs or familiar words in the sessions motivated the child's verbalisation by singing, speaking, and expressing his needs. It was also an effective way to build rapport with the child. Building rapport was important in music therapy sessions affecting the level of the child's trust allowing him to feel comfortable to complete tasks. After the child finished each task, reinforcement actions were given to the child encouraging him to do more tasks when prompts were given or the iso-principle technique was applied in each of the activities.

In this study, designing the music therapy interventions that are relevant to the child's needs is a very important process. The uniqueness of this intervention is focused on an interactive process through music activities that can facilitate the interaction between the child and his mother not only in the music therapy sessions but also in their home. In this study, the mother was clearly advised and trained about the steps of using music activities both in music therapy sessions and in home music activities to enhance the child's sentence verbalisation. The child must receive continuous motivation and learning of sentences at home in order that he might be familiar with sentences and to further improve sentence verbalisation skills. Thus, in time the child may be able to use the sentences by himself.

The findings in this case were based on an in-depth study of an individual and cannot be generalised to the entire population of children with ASD. Since children with ASD have different characteristics and abilities, more studies are needed to affirm that music therapy interventions for an individual child can increase sentence verbalisation in children with ASD. The findings in this study will benefit music therapists who work with language goals for children with ASD. Therapists can apply and adapt their own music interventions based on the child's needs including determining the function of music, selecting appropriate songs and using music

therapy strategies to encourage interaction between parents and their child in order to increase the child's ability to verbalise sentences effectively.

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