



Music Therapy for Children with Down Syndrome: Perceptions of Caregivers in a Special School Setting

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ABSTRACT

Down syndrome (DS) is a genetic disorder resulting from chromosome 21 having three copies (trisomy 21). Cognitive functioning and anatomical features cause speech and language development delay (Kumin, 2003). Children with DS generally enjoy communication (Schoenbrodt, 2004), and respond well to interaction and social scripts. Music therapy has been extensively used in the past four decades as a treatment for children with disabilities (Nordoff & Robbins, 2007; Wigram, Pederson & Bonde, 2002). Children with DS seem specifically responsive to music and show potential to be part of group music-making (Wigram et al., 2002). In both speech and music, rhythm and sound are primary elements and all elements of music may be integrated into a speech-language programme (Birkenshaw, 1994; Wilmot, 2004). Family and caregiver support are required for therapy to be effective. Caregivers' views of music therapy for children with DS were examined as a preliminary step in the evaluation of music therapy outcomes for this population. A questionnaire examining perspectives of effects of music on the communication development of children with DS was given to 19 caregivers of children with DS working in a special school environment. Consistent with reports in the literature, caregivers perceive children with DS as responsive to music, and to have musical and communicative strengths. Caregivers perceived that communication and social skills may develop through regular music therapy sessions. These perceptions corresponded with the views of music therapists who were later interviewed as part of this study.

Research paper

Keywords: *Caregivers, communication, music therapy, special schools*

INTRODUCTION

Neuro-imaging studies show that music and speech share common neural resources (Friedrich, 2004). The musical elements of sound, rhythm, melody and harmony overlap with the linguistic prosodic elements of pitch, loudness, duration and pause (Deliege & Sloboda, 1996; Loewy, 2004; Zatorre, Belin & Penhune, 2002). Spoken communication

involves not only speech, but also gestures, facial expressions, eye-contact, body postures and tones of voice (Kumin, 2003; Littlejohn & Foss, 2008). Any communication is a process whereby messages are sent and received in such a way that the involved participants can understand the stated and implied meaning (Kumin, 2003; Napoli, Kilbride & Tebbs, 1996). Music therapy aims to promote both communication and relationships (Bunt, 1994). Music therapists perceive communication and social interaction as pivotal to music therapy and consider music as an alternative communication that is beneficial to clients who lack adequate verbal language, or other means to express themselves (Mercado, 2004; Rainey-Perry, 2003). Turn-taking ability indicates progress in the communication and social development of children and can be developed and assessed through music (Rainey-Perry, 2003; Wilmot, 2004). Turn-taking between therapist and client is encouraged through improvisation and instrument-playing in music therapy sessions (Lathom-Radocy, 2002; Rainey-Perry, 2003).

WHAT IS MUSIC THERAPY?

Music therapy is too diverse and complex in clinical practice to be...contained by a single approach...population...practitioner... Each...practice is only a part of the whole, and should not be mistaken for the whole of music therapy...music therapy practice has a collective identity...(Bruscia, 1998, p.261).

Music has been used for centuries as a therapeutic tool, and for religious and other ceremonies, (Schmidt Peters, 2000; Wigram et al., 2002). Even today at rugby matches and during political rallies, music unites people (Gannon, 1995a). The ancient Greeks considered music as essential in societies (Alvin, 1975; Wigram et al., 2002). Circa 17th century physicians started considering therapy from both the physiological and psychological point of view (Alvin, 1975). Richard Browne noted in the early 1700s the positive effect of singing on lung difficulties. In a book written in 1748, Louis Roger, a French physician, emphasised the need for scientific observation and experiments to ascertain the effects of music on the human body (Alvin, 1975). The 'new' discipline of music

therapy started emerging in the 1960s (Bunt & Hoskyns, 2002; Schmidt-Peters, 2000; Wigram et al., 2002), based on experimental studies, structured behavioural observations, standardised tests and checklists, interviews, participant observation and narratives (Wigram et al., 2002). Many approaches influenced music therapy, including the behavioural approach of Gaston and Sear, where music, the tool in therapy, is a reinforcement to increase or modify adaptive behaviours and extinguish maladaptive behaviours. Juliette Alvin's Free Improvisation Therapy advocates music making and music listening (Alvin, 1975). Nordoff and Robbins' Creative Music Therapy concentrates on the potential of the child; this approach was developed mainly for children with developmental and learning disabilities (Nordoff & Robbins, 1975).

Process is important in music therapy sessions and change and development are expected to occur over time, with the goal being improved quality of life (Bruscia, 1995; Wigram & De Backer, 1999). Process is facilitated by goals/plans in therapy (Bunt & Hoskyns, 2002). The World Federation of Music Therapy indicates that any type of music can be used in a controlled way in music therapy sessions, including classical, jazz, rock, folk etc. Singing, instrument playing, listening, moving and creating new music can all be part of music therapy sessions (Birkenshaw, 1994; Schmidt-Peters, 2000; Wigram et al., 2002). Instrumental dialogue can develop through drumming or the use of other instruments (Wigram & De Backer, 1999; Wilmot, 2004). Sound, an integral part of music therapy sessions, includes pitch, volume and tone colour, for example, the differences perceived by the listener when listening to a cello versus a trumpet (Kamien, 1988; Samson, 2003; Samson, Zatorre & Ramsay, 2002). Rhythm includes tempo and regular beats in the music (Bunt & Hoskyns, 2002; Orff, 1989; Wigram & De Backer, 1999). Melody implies sounds that are put together (Baker, Wigram & Gold, 2005; Wigram et al., 2002). Harmony refers specifically to the intervals between notes (Bod, 2002; Gannon, 1995a, 1995b).

MUSIC AND COMMUNICATION

Speech/language and music both involve perceptual, cognitive and musical processes. Humming a simple familiar tune activates complex auditory processing, attention, memory, motor-programming and sensory integration circuits in the brain (Zatorre, 2005). Sensory awareness, auditory attention, perception, discrimination and memory can all be increased by musical experiences (Schmidt-Peters, 2000). Imitation and echoing of sounds, words and rhythm are important in both speech/language and music (Plantinga & Trainor,

2009; Trainor, Shahin, & Roberts, 2009). In both language acquisition and music learning repetition, the repeated reinforcement of learning material (not the stereotypical perseverance displayed by some children with autism spectrum disorder, for example) is fundamental to the learning process (Bochner & Jones, 2003; Sheridan, 2004). A child's ability to imitate is a measure of cognitive readiness to learn language (Butterfield, 1994). In both language and music there are developmental sequences (Zatorre et al., 2002). Babies explore the musical/prosodical elements of speech in canonical babbling, continuously producing syllables consisting of a consonant and a vowel, such as /bababababa/. This is a vocal milestone for speech acquisition (Paul, 2001; Stoel-Gammon, 2005). The emotional or affective aspect of the vocal exchange between parent and baby is important (Santesso, Schmidt & Trainor, 2007). Infant-directed speech influences frontal brain activity and the heart rate of babies (Santesso et al., 2007). Long before infants can talk or sing, they try to pick up the pitch, imitate, anticipate and join in, and a tuneful, melodious duet can occur between a baby and the person interacting with them (Trainor, Clark, Huntley & Adams, 1997). Caregivers' singing and rocking has rhythmic patterns that influence the child. Young children often sing while they play, for example, bounce a ball while chanting – making up their own rhymes and singing them. Rhythm and movement both are part of the early exchange between carers and infants (Papousek, 1996; Plantinga & Trainor, 2005; Trainor & Zacharias, 1998) and are present in children's early social play (O'Neill, Trainor & Trehub, 2001; Trehub & Trainor, 1998). Songs and movement sequences lead to anticipation of cues to perform or communicate (Lathom-Radocy, 2002).

IMPACT OF DOWN SYNDROME ON COMMUNICATION

DS is the most common biological cause of developmental delay. Better medical treatment leads to more people with DS surviving for longer, with implications for treatment (Rondal, Rasore-Quartino & Soresi, 2004). DS causes mild to moderate mental retardation which affects learning (Kumin, 2004; Schoenbrodt, 2004). The language abilities of children with DS vary and are more impaired than would be expected based on their cognitive abilities (Laws & Bishop, 2004; Seung & Chapman, 2004). Children with DS have difficulties with auditory perception and processing, articulation problems, and difficulty learning language rules. Some have hearing loss, visual defects and motor delay, which can impact on their cognitive development (Buckley, 1993a, 1993b; Kumin, 2003). Motivational problems contribute to their learning challenges (Wishart, 2002).

Infants with DS typically have good early non-verbal skills, although developing slower. They can enjoy babbling games in interaction (Buckley, 1993a; Rondal & Buckley, 2003) and show an ability for and inclination towards communication. Usually this trend continues through the life span (Rondal et al., 2004). Social communication is a relative strength in children with DS (Laws, Byrne & Buckley, 2000). They have more interest in people and do not respond in a typical way to interactions which involve a person and an object (Buckley, 1993a, 1993b; Roach et al., 1998). This lack of referential eye-contact (moving the eyes from person to object and back again) leads to reduced opportunity for a caregiver to name an object and talk about it. It is also possible that the mothers of children with DS interact differently with their children than other mothers, because of their children's perceived (or real) disabilities (Buckley, 1993a).

Children with DS can find it particularly difficult to sequence words, and struggle with syntax, tending to omit verbs and functional words (Buckley & Bird, 2002; Turner & Alborz, 2003). In typically developing children, auditory short-term memory is linked to general language development (Laws et al., 2000). Children with DS have poor auditory working memory, which may relate to the problem they have with language rules and processing (Buckley, 1993b; Conners, Rosenquist & Taylor, 2001). Most typically developing children are intelligible by four years of age, but children with DS may not develop speech that will be intelligible to unfamiliar listeners (Stoel-Gammon, 2001). This supports the use of non-verbal modalities for expression such as music, gesture and sign. Children with DS are typically eager to interact and communicate and show strengths in gesturing. Learning sign language may help them feel less frustrated when communicating (Buckley, 1993a; Buckley, 2003; Wilkin, 2005).

MUSIC THERAPY FOR CHILDREN WITH DS

Children learn through spontaneous interactions in their natural environment and children with developmental disabilities can similarly learn (Vilaseca & Del Rio, 2004). Early intervention programmes with children who have DS have proved to be successful in a range of domains including language and reading development (Hanson, 2003). A strength of music therapy for children with DS with language delay and unintelligible speech is the non-verbal medium created to support expression of emotions and ideas through dancing, singing and music-making (Atkins et al., 2003; Trainor & Zatorre, 2009; Wosch & Frommer, 2002).

Music therapy is a relatively new discipline in New Zealand, but it is now well-established as an approach for facilitating communication development and social interaction in children with developmental disabilities. Music is used as a communication tool in music therapy sessions and relationships are pivotal in these sessions (Pavlicevic, 2005; Rainey-Perry, 2003). Hence, an understanding of the therapy process is important for all those working with the child. Anecdotally, the role and processes of music therapy do not appear to be widely understood. Therefore, the aim of the current study was to explore perceptions of music therapy amongst caregivers of children with DS in a special school setting. Caregivers were the focus of this study as they spend considerable time with the children during the school day and see the child in a range of environments including therapy sessions and the classroom. It was hypothesised that caregivers would perceive that children with DS respond well to music, and music therapy facilitates their communication development.

METHODOLOGY

The study was approved by the University of Auckland Human Participants Ethics Committee. The principal of a special school was approached for permission to contact teacher-aides/caregivers who were working at the school. Nineteen of 34 potential participants at the school completed the questionnaire anonymously and returned it via a drop box. Respondents had a diverse range of experience, academic background and expertise in working with children with DS.

A 29-item questionnaire that could be completed in 10-15 minutes was developed based on other checklists developed for children with developmental disabilities and for music therapy. The final questionnaire was reviewed by clinicians and researchers prior to administration. A 6-point Likert scale was used for questionnaire responses, with '1' indicating that a respondent strongly agreed with a statement and '6' indicating strong disagreement. An open-ended question was included so that caregivers could write additional comments if they wished.

RESULTS

Caregivers' years of experience working with students with special needs varied from 0.5-16 years, with an average of 5.5 years. Six respondents reported experience working with students with DS, varying from one to 16 years. One respondent had 40 years experience working as a teacher with students with special needs, including DS. Six people indicated extensive experience with music therapy, four indicated

some experience and six indicated limited experience.

The questionnaire showed excellent internal questionnaire reliability (Cronbach's $\alpha=0.94$). Responses to most questionnaire items (Appendix A) were clustered around certain ratings rather than normally distributed across the scale. Thus, in spite of the broad range of experience and background knowledge of the respondents, they had similar perceptions about children with DS, their communicative behaviour and their responses to music. They had a basic understanding of music therapy and, as a group, indicated the importance of relationships within the music therapy session. Their responses indicated that they recognised that client/student and teacher/therapist communicate with music in these sessions. Overall, caregivers agreed with the statement that music therapy means listening to different kinds of music and making music.

Caregivers strongly believed that children with DS enjoy music, like to move/dance when they hear music and they like to perform. The caregivers also indicated that conversation without words is possible in a music session. Another strong belief of caregivers was that children with DS often listen to music when they are on their own. Caregivers generally agreed that children with DS recognise songs, like to sing, laugh a lot and make sounds during music sessions. According to the caregivers, they are keen to play instruments and imitate sounds and movements, and have a fair sense of rhythm. Enthusiasm and increase in activity levels during music sessions were indicated by caregivers. Children with DS were perceived by caregivers as taking turns when making music and they perceived that it may be easier to make eye contact when there is music. Caregivers perceived that generalisation takes place; that is, music therapy with children with DS facilitates more effective communication in other classroom situations.

The caregivers agreed that children with DS can express emotions in music sessions and that they are often difficult to understand when they use speech. Caregivers did not think that children with DS always listen to others when they make music, they do not wait their turn patiently and they do not readily initiate new activities in music sessions. The respondents highlighted that children with DS have very individualised ways of responding to music. In conflict with reports that children with DS enjoy music and like to listen to music when they are on their own, the caregivers perceived that children with DS do not consistently ask for music sessions. However, caregivers in this study work with children with DS who are not mainstreamed,

and who fall on the lower spectrum of functioning. Thus, the children may not be able to ask for music sessions, even if they would like to.

DISCUSSION

Music therapists believe that music can support the child with learning difficulties to learn communication strategies in a relaxed atmosphere (Birkenshaw, 1994; Wigram & De Backer, 1999; Wilmot, 2004). Responses to this survey indicate that, in general, caregivers within the special school setting support this view. Children with DS were generally perceived as responding well to music, and there was agreement with the view that music has the potential to enhance communication development in children with DS. In general, the caregivers' views were consistent with music therapists' views that children with DS enjoy music, like to move/dance when they hear music and like to perform (Cohen, 1993; Pratt, 2004). The motivational aspect of music was also acknowledged. This suggests a potentially important aspect of music therapy as the literature indicates that children with DS can have poor motivation (Turner & Alborz, 2003; Wishart, 2002, 2005). It is encouraging for the future of music therapy that some caregivers in the current study with no training in music therapy had the perception that this therapy is beneficial for children with DS. They generally agreed that music therapy is a non-threatening activity that takes place in an emotionally-safe environment. One caregiver commented that everyone can succeed in music sessions and that music therapy should always be part of the programme in special schools.

Children with DS have a relative strength in the areas of social interaction (Buckley, 2003) and hence group music therapy may be especially beneficial. It is a challenge to find treatments that can be generalised for children with DS, as there is such immense variation in abilities of these children. Music therapy can be individualised in group sessions by doing specific activities where individuals need to respond within the group. There are established tools for measuring musical responsiveness (Nordoff & Robbins, 2007) that can be used to assess the benefits of music therapy, however, communication development should also be assessed if this is a therapy goal. The following suggested strategies for a group music therapy session for children with DS could be adopted in the other educational or therapy sessions:

- a. Sessions should follow a structured outline, with time allowance for spontaneous development of improvisational activities.
- b. Add sequencing activities and songs, repeated over many sessions to aid memory.

- c. Use known songs repeatedly.
- d. Use drums, other percussion instruments, piano, and/or guitar for part of the sessions.
- e. Add activities that facilitate turn-taking and sharing.
- f. Give clear, short instructions.
- g. Add listening activities.
- h. Use musical games and dance movements.

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

The relative benefits of different aspects of music-making, such as singing, dancing, instrument playing, or a combination of all are not yet known and require further investigation to determine which musical activities are most beneficial for the communication and social development of children with DS. Other areas for further investigation include the musical aptitude of children with DS, the effects of choir singing and voice training on singing tones, and the use of music to improve memory and hence literacy and language development. People with DS have a broad spectrum of abilities (Buckley, 1993a; Dodd & Thompson, 2001; Laws & Bishop, 2004; Moore et al., 2002; Wishart, 2002, 2005), and caregivers in the current study agreed that children with DS can show quite individualised responses to music. Because of this variability, music therapy may be of greater benefit for certain individuals with DS. Further research is needed to determine those who will benefit most from music therapy. Parental input would be valuable in future studies to determine the role of music for children with DS outside of the school setting. There is increasing interest in the benefits of music and singing for general health and wellbeing and brain development, both for the general population and for people with acquired or developmental disabilities. The views of caregivers of children with DS reported here are consistent with the views of music therapists and other researchers and professionals, that people with DS show a particular interest in and aptitude for musical activities (Wigram et al., 2002). Further investigation using controlled intervention studies is recommended to establish the benefits of specific music therapy interventions for communication and social development of children with DS.

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Dorothea Pienaar is passionate about arts teaching and the effect it has on the general communication development of students. Presently she is the Arts coordinator at Goldfields Special School and teaches music, dance and drama in an integrated way to classes as well as individuals, from 5-21 years old. She has presented at several international conferences on Music Therapy, Expressive Arts Therapy, Arts in Society and Dance Therapy, held in Australia, Europe and North- as well as South America. Her work with special needs students spans many years in New Zealand, as well as South Africa.

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APPENDIX A

Questionnaire items and mean ratings for each item on 6-point scale. Standard deviations are in parentheses. Minimum to maximum responses are shown in the right column. 1=strongly agree.

#	Item Wording	Mean	Range
1	I have experience with the use of music therapy with children with Down Syndrome	3.1 (2.1)	1-6
2	Music therapy means listening to different kinds of music	2.5 (1.3)	1-5
3	Music therapy means making music	2.5 (1.3)	1-6
4	Music therapy involves relationships	1.7 (0.8)	1-3
5	In music therapy the student/client and teacher communicate with music	1.8 (0.8)	1-3
6	Children with Down Syndrome enjoy music	1.8 (0.8)	1-3
7	It is easy to make eye contact with a child when there is music	2.7 (0.9)	1-4
8	A student with Down Syndrome will take turns with the caregiver/therapist when making music	2.5 (1.2)	1-5
9	Children with Down Syndrome wait their turn patiently	3.5 (1.5)	1-6
10	Music Therapy helps children with Down Syndrome communicate more effectively in other classroom situations	2.7 (1.2)	1-4
11	Children with Down Syndrome listen to others when they make music	3.2 (1.1)	2-5
12	Children with Down Syndrome like to play instruments	2.5 (1.0)	1-4
13	Children with Down Syndrome like to imitate sounds and movements	2.3 (0.9)	1-4
14	Children with Down Syndrome like to initiate new activities in the music session	3.4 (1.3)	2-6
15	Children with Down Syndrome are often difficult to understand when they use speech	2.8 (1.5)	1-6
16	A conversation is possible in a music session without using words	1.9 (0.9)	1-4
17	Children with Down Syndrome like to move/dance when they hear music	2.0 (1.3)	1-5
18	Children with Down Syndrome have a good sense of rhythm	2.9 (1.0)	1-5
19	Children with Down Syndrome recognise different songs	2.4 (1.2)	1-5
20	Children with Down Syndrome like to sing	2.6 (1.0)	1-5
21	Children with Down Syndrome make sounds during music sessions	2.4 (1.0)	1-4
22	Children with Down Syndrome usually understand instructions in a music session	2.9 (1.2)	1-5
23	Children with Down Syndrome are more enthusiastic and active in music sessions than in other types of teaching sessions	2.3 (1.3)	1-5
24	Children with Down Syndrome can express emotions in music sessions	2.7 (1.4)	1-5
25	Children with Down Syndrome have longer concentration in music sessions than in other types of teaching sessions	2.8 (1.1)	1-5
26	Children with Down Syndrome ask for music sessions	3.5 (1.3)	2-6
27	Children with Down Syndrome like to perform	2.2 (1.2)	1-5
28	Children with Down Syndrome laugh a lot in music sessions	2.5 (1.3)	1-5
29	Children with Down Syndrome often listen to music when they are on their own	2.2 (1.2)	1-4