Music for Children with Autism and Other Developmental Disabilities:
2009 Abstracts, compiled by Beverly Seng, CMP

1. The effect of music on peer awareness in preschool age children with developmental disabilities. Sussman JE.

J Music Ther. 2009 Spring;46(1):53-68.
University of Missouri-Kansas City, USA.

The purpose of this study was to determine the effect of music on peer awareness in preschool age children with developmental disabilities. Specifically, this study sought to find which combinations of musical and play elements produced the longest durations of sustained attention towards peers and the highest frequency of alternating attention from peer to peer. Nine children between the ages of 2 and 6 who had been diagnosed with a developmental disability participated in the study. Each participant completed 4 small group sessions with the researcher and 2 other research participants. During each session, the children participated in activities targeting peer awareness that incorporated musical and play elements. Behavioral data were recorded representing the children's sustained and alternating attention towards peers. **Results indicated that children sustained attention towards peers for the longest durations and alternated attention from peer to peer at the highest frequencies during activities that utilized a musical object within a nonmusical or play-based context**.

PMID: 19256732 [PubMed - indexed for MEDLINE]

2. Effects of developmental music groups for parents and premature or typical infants under two years on parental responsiveness and infant social development.

Walworth DD. J Music Ther. 2009 Spring;46(1):32-52.
The Florida State University, USA.

The purpose of this study was to examine the effect of music therapy intervention **on premature infants' and full term infants' developmental responses and parents' responsiveness**. Subjects (n=56) were parent-infant dyads who attended developmental music groups or a control condition assessing responsiveness during toy play. All subjects were matched according to developmental age and were also matched by group for socioeconomic status and for maternal depression. Types of infant play and parent responsiveness were measured using observation of a standardized toy play for parent-infant dyads. Observations were coded with the

number of seconds spent in each behavior using the SCRIBE observation program. Parents completed a questionnaire on the perception of their infant's general development, interpretations of their child's needs, the purpose of using music with their child, and their child's response to music. **The infants attending the developmental music groups with their parents demonstrated significantly more social toy play** ($p < .05$) during the standardized parent-infant toy play than infants who did not attend the music groups. **While not significant, graphic analysis of parent responsiveness showed parents who attended the developmental music groups engaged in more positive and less negative play behaviors with their infants** than parents who did not attend the music groups. This study demonstrates the **first findings of positive effects of developmental music groups on social behaviors for both premature and full term infants under 2 years old.**

3. Emotional, motivational and interpersonal responsiveness of children with autism in improvisational music therapy.

Kim J, Wigram T, Gold C. Autism. 2009 Jul;13(4):389-409

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Through behavioural analysis, this study investigated the social-motivational aspects of musical interaction between the child and the therapist in improvisational music therapy by measuring emotional, motivational and interpersonal responsiveness in children with autism during joint engagement episodes. The randomized controlled study (n = 10) employed a single subject comparison design in two different conditions, improvisational music therapy and toy play sessions, and DVD analysis of sessions. **Improvisational music therapy produced markedly more and longer events of 'joy', 'emotional synchronicity' and 'initiation of engagement' behaviours** in the children than toy play sessions. In response to the therapist's interpersonal demands, 'compliant (positive) responses' were observed more in music therapy than in toy play sessions, and **'no responses' were twice as frequent in toy play sessions as in music therapy.** The results of this exploratory study found significant evidence supporting the **value of music therapy in promoting social, emotional and motivational development in children with autism.**

PMID: 19535468 [PubMed - indexed for MEDLINE]

4. The effect of background music and song texts on the emotional understanding of children with autism. Katagiri J. J Music Ther. 2009 Spring;46(1):15-31.

The Florida State University, USA.

The purpose of this study was to examine the effect of background music and song texts to teach emotional understanding to children with autism. Participants were 12 students (mean age 11.5 years) with a primary diagnosis of autism who were attending schools in Japan. Each participant was taught four emotions to decode and encode: happiness, sadness, anger, and fear by the counterbalanced treatment-order. The treatment consisted of the four conditions: (a) no contact control (NCC)--no purposeful teaching of the selected emotion, (b) contact control (CC)--teaching the selected emotion using verbal instructions alone, (c) background music (BM)--teaching the selected emotion by verbal instructions with background music representing the emotion, and singing songs (SS)--teaching the selected emotion by singing specially composed songs about the emotion. Participants were given a pretest and a posttest and received 8 individual sessions between these tests. **The results indicated that all participants improved significantly in their understanding of the four selected emotions. Background music was significantly more effective than the other three conditions in improving participants' emotional understanding.** The findings suggest that background music can be an effective tool to increase emotional understanding in children with autism, which is crucial to their social interactions.

PMID: 19256729 [PubMed - indexed for MEDLINE]

5. The Effect of Music on Social Attribution in Adolescents with Autism Spectrum Disorders. Bhatara AK, Quintin EM, Heaton P, Fombonne E, Levitin DJ.

Child Neuropsychol. 2009 Jan 13:1-22. [Epub ahead of print]

McGill University, Montreal, Canada.

High-functioning adolescents with ASD and matched controls were presented with animations that depicted varying levels of social interaction and were either accompanied by music or silent. Participants described the events of the animation, and we scored responses for intentionality, appropriateness, and length of description. **Adolescents with ASD were less likely to make social attributions, especially for those animations with the most complex social interactions. When stimuli were**

accompanied by music, both groups were equally impaired in appropriateness and intentionality. We conclude that adolescents with ASD perceive and integrate musical soundtracks with visual displays equivalent to typically developing individuals.

PMID: 19140055 [PubMed - as supplied by publisher]

6. Novel and emerging treatments for autism spectrum disorders: a systematic review.

Rossignol DA. Ann Clin Psychiatry. 2009 Oct-Dec;21(4):213-36.

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BACKGROUND: **Currently, only one medication (risperidone) is FDA-approved for the treatment of autism spectrum disorders (ASD).** Perhaps for this reason, the use of novel, unconventional, and off-label treatments for ASD is common, with up to 74% of children with ASD using these treatments; however, treating physicians are often unaware of this usage. METHODS: **A systematic literature search of electronic scientific databases was performed** to identify studies of novel and emerging treatments for ASD, including nutritional supplements, diets, medications, and nonbiological treatments. A grade of recommendation ("Grade") was then assigned to each treatment using a validated evidence-based guideline as outlined in this review**: A: Supported by at least 2 prospective randomized controlled trials (RCTs) or 1 systematic review.** B: Supported by at least 1 prospective RCT or 2 nonrandomized controlled trials. C: Supported by at least 1 nonrandomized controlled trial or 2 case series. D: Troublingly inconsistent or inconclusive studies or studies reporting no improvements. Potential adverse effects for each treatment were also reviewed. RESULTS: **Grade A treatments for ASD include melatonin, acetylcholinesterase inhibitors, naltrexone, and music therapy.** Grade B treatments include carnitine, tetrahydrobiopterin, vitamin C, alpha-2 adrenergic agonists, hyperbaric oxygen treatment, immunomodulation and anti-inflammatory treatments, oxytocin, and vision therapy. Grade C treatments for ASD include carnosine, multivitamin/mineral complex, piracetam, polyunsaturated fatty acids, vitamin B6/magnesium, elimination diets, chelation, cyproheptadine, famotidine, glutamate antagonists, acupuncture, auditory integration training, massage, and neurofeedback. CONCLUSIONS: The reviewed treatments for ASD are commonly used, and some are supported by prospective RCTs. Promising treatments include melatonin, antioxidants, acetylcholinesterase inhibitors, naltrexone, and music therapy. All of the reviewed treatments are currently considered off-label for ASD (ie, not FDA-approved) and some have adverse effects. Further

studies exploring these treatments are needed. Physicians treating children with an ASD should make it standard practice to inquire about each child's possible use of these types of treatments.

PMID: 19917212 [PubMed - in process]

7. Exploring musical taste in severely autistic subjects: preliminary data.

Boso M, Comelli M, Vecchi T, Barale F, Politi P. Ann N Y Acad Sci. 2009 Jul;1169:332-5.

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As a consequence of frequent limbic alterations, autistic persons could judge pleasant and unpleasant music in an unusual manner. We explored this possibility by using consonant and dissonant music (test 2) and excluded the eventuality that they could prefer other auditory stimuli by comparing familiar music to environmental sounds (test 1). In both tests, severe autistics and controls were asked to listen under two conditions (familiar music versus environmental sounds; pleasant versus unpleasant music) in a counterbalanced order while the time spent during each condition was measured. Both groups significantly preferred the musical task and the pleasant music condition. No difference between groups was detected. Results demonstrate that severely autistic subjects share with healthy people the same musical preferences.

PMID: 19673802 [PubMed - indexed for MEDLINE]

8. "With concord of sweet sounds...": new perspectives on the diversity of musical experience in autism and other neurodevelopmental conditions.

Heaton P, Allen R.

Ann N Y Acad Sci. 2009 Jul;1169:318-25.

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Questions about music's evolution and functions have long excited interest among scholars. More recent theoretical accounts have stressed the importance of music's social origins and functions. Autism and Williams syndrome, neurodevelopmental disorders supposedly characterized by contrasting social and musical phenotypes, have been invoked as evidence for these. However, empirical data on social skills and

deficits in autism and Williams syndrome do not support the notion of contrasting social phenotypes: research findings suggest that the **social deficits characteristic of both disorders may increase rather than reduce the importance of music**. Current data do not allow for a direct comparison of musical phenotypes in autism and Williams syndrome, although it is noted that deficits in music cognition have been observed in Williams syndrome, but not in autism. In considering broader questions about musical understanding in neurodevelopmental disorders, we conclude that intellectual impairment is likely to result in qualitative differences between handicapped and typical listeners, but this **does not appear to limit the extent to which individuals can derive benefits from the experience of listening to music.**

PMID: 19673800 [PubMed - indexed for MEDLINE]

9. Rhythm reproduction in kindergarten, reading performance at second grade, and developmental dyslexia theories.

Dellatolas G, Watier L, Le Normand MT, Lubart T, Chevrie-Muller C.

Arch Clin Neuropsychol. 2009 Sep;24(6):555-63. Epub 2009 Jul 22.

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Temporal processing deficit could be associated with a specific difficulty in learning to read**. In 1951, Stambak provided preliminary evidence that children with dyslexia performed less well than good readers in reproduction of 21 rhythmic patterns.** Stambak's task was administered to 1,028 French children aged 5-6 years. The score distribution (from 0 to 21) was quasi-normal, with some children failing completely and other performing perfectly. In second grade, reading was assessed in 695 of these children. Kindergarten variables explained 26% of the variance of the reading score at second grade. **The Stambak score was strongly and linearly related to reading performance in second grade, after partialling out performance on other tasks (oral repetition, attention, and visuo-spatial tasks) and socio-cultural level.** Findings are discussed in relation to perceptual, cerebellar, intermodal, and attention-related theories of developmental dyslexia. It is concluded that simple rhythm reproduction tasks in kindergarten are predictive of later reading performance.

PMID: 19628461 [PubMed - indexed for MEDLINE]

10. Motor timing and precursor literacy skills in very young children.

Wigley C, Fletcher J, Davidson J. Ann N Y Acad Sci. 2009 Jul;1169:512-5.

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It is generally agreed that efficiency in processing basic speech sounds is a strong indicator of literacy outcomes. However, there is some debate about the extent to which this capacity is encapsulated within the language system. We report results based on pretest data obtained in an early music training study investigating the **relationship between a motor-rhythmic measure of ability (synchronous tapping) and the purported purely linguistically based processing** measures, Rapid Automatized Naming (RAN) and Phonological Awareness (PA). Results suggest **that RAN ability relies to some extent on nonlinguistic temporal processing skills.**

PMID: 19673833 [PubMed - indexed for MEDLINE]

11. Musical training modulates the development of syntax processing in children.

Jentschke S, Koelsch S. Neuroimage. 2009 Aug 15;47(2):735-44. Epub 2009 May 7.

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The question of how musical training can influence perceptual and cognitive abilities of children has been the subject of numerous past studies. However, evidence showing which neural mechanisms underlie changes in cognitive skills in another domain following musical training has remained sparse. Syntax processing in language and music has been shown to rely on overlapping neural resources, and this study compared the neural correlates of language- and music-syntactic processing between children with and without long-term musical training. Musically trained children had larger amplitudes of the ERAN (early right anterior negativity), elicited by music-syntactic irregularities. Furthermore, the ELAN (early left anterior negativity), **a neurophysiological marker of syntax processing in language, was more strongly developed in these children**, and they furthermore had an enlarged amplitude of a later negativity, assumed to reflect more sustained syntax processing. Thus, our data suggest that the neurophysiological mechanisms **underlying syntax processing in music and language are developed earlier**, **and more strongly, in children with musical training.**

PMID: 19427908 [PubMed - indexed for MEDLINE]

12. A case study of a five-year-old child with pervasive developmental disorder-not otherwise specified using sound-based interventions.

Nwora AJ, Gee BM. Occup Ther Int. 2009;16(1):25-43.

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The aim of this study was to determine the efficacy of The Listening Program (TLP) in treating a child with pervasive developmental disorder-not otherwise specified (PDD-NOS). Using a single-subject case study design, one child with PDD-NOS was administered a 20-week TLP intervention focused on improving sensory processing and language function. Data collection included pre- and post-evaluations using video footage, and Sensory Profile and Listening Checklist questionnaires. Results of the study indicated improved behaviour and sensory tolerance in the post-intervention video footage, including active participation in singing and movements to song. Sensory Profile and Listening Checklist questionnaires indicated **significant improvements in sensory processing, receptive/expressive listening and language, motor skills, and behavioural/social adjustment at the post-intervention assessment**. Although small in scope, this study highlights the need for continued research by occupational therapists into sound-based interventions. Particularly, occupational therapists need to perform larger-scale studies utilizing TLP to verify the efficacy of this alternative treatment method. 2009 John Wiley & Sons, Ltd