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Music Enhances Sleep in Preschool Children

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Background classical guitar music was played to preschool children at naptime on alternate days in order to assess its effect on naptime sleep onset. On the music versus no music days the children fell asleep faster, and the toddlers faster than the preschoolers.

Key words: Music, sleep, preschool children

Music stimulation has been used as early as the neonatal period to calm the infant as well as during the fetal period to assess the fetus' discrimination of different music pieces. Exposure to music during the preschool period has been studied in the context of how that exposure facilitates early learning. Studies have shown, for example, that exposure to classical music during the preschool period enhances later math performance and reading in beginning readers. (Lamb & Gregory, 1993). In the Lamb and Gregory (1993) study, the relationship between phonemic and musical sound discrimination during the preschool period and reading ability during the first year at school was investigated. Awareness of changes in pitch and timbre of musical stimuli were assessed using a specially designed test of musical ability. Tests of phonemic awareness and reading performance were also administered with particular emphasis on ability and employing phonemic skills in reading. The results supported the hypothesis that discrimination of musical sounds was related to reading performance and that the influential factor in this relationship was the specific awareness of pitch changes. Another study focused on the processing of musical stimuli by infants and young children (Trehaub, 1993). Using a procedure for studying music skills in infancy as well as detecting melody changes, preschool children were noted to understand the emotional meanings of music. The prerequisite for the acquisition of a music vocabulary were their experience with listening to music in infancy and early childhood.

Other music studies during the preschool period have focused on the effects of music programs on children's performance at the contemporaneous preschool period. For example, Nichols and Honig, (1995) investigated the effects of a music

curriculum on 90 preschool children's response to music. In their investigation they observed children's responses as they participated in a singing activity led by their teachers. The children attended to their teachers during music activities, especially when the teachers had been trained in musical activities with young children. A similar study investigated the influences of background music on preschoolers' behavior in the classroom (Godeli, Santana, Souza and Marquetti, 1996). The preschool children were observed naturally during their classroom activities including their social interactions, their spatial localization, and their posture. Two types of music including folk and rock-and-roll music were used. Strong influences were noted for both types of music, suggesting that after the music presentations the frequencies of child-to-child social interactions increased significantly and frequencies of interactions with the teacher diminished.

A study on changes in brain electric activity during music may help explain some of the previous findings suggesting that children become more responsive following music. (Malyarenko, Kuraev, Malyarenko & Khatova, 1996). In a recent study of brain electrical activity in preschool children following long-term sensory stimulation with music, 23 preschool children were exposed to classical music one hour per day over a six-month period. Brain electrical activity parameters indicated that listening to music resulted in an increase of alpha rhythm power, especially in the left hemisphere of the frontal cortex, suggesting increased relaxation. It may be that the music-induced relaxation contributed to the enhanced responsiveness in both free play interaction situations and in learning situations in preschool and later, as noted in the previous studies. The same music-induced relaxation could conceivably also contribute to shorter latency to sleep in preschool children during naptime.

The purpose of the present study was to examine the effects of classical music (the most popularly used music in the previous studies) on children's nap times. The long latency to sleep at naptime can be a problem in preschool both because it disrupts the sleep of the other children and because it places extra demands on the time and energies of the teachers. We were interested in whether music might similarly facilitate sleep in preschool children.

METHOD

Subjects

Twelve toddlers (M age = 19 months) and 12 preschoolers (M age = 32 months) were observed at their afternoon naptime on two days when they were provided background classical guitar music and two days when they were not provided music (the 4 days being alternated). The toddlers and preschoolers attended a model preschool and were of mixed ethnicity (58% Caucasian, 22% Hispanic, 17% African-American and 3% other). The children came from middle SES backgrounds (Holingshead index = 2.3) and were full-term and in good health. The children attended preschool full-time on a daily basis and were accustomed to having daily naps following their lunch period.

Procedure

The children were asked to find their naptime places in the toddler room in the case of the toddlers and the preschool classroom in the case of the preschoolers. On days 1 and 3, music was played in the toddler classroom but not the preschool and on days 2 and 4 the music was played in the preschool classroom but not the toddler classroom. A selection of classical guitar pieces by Christopher Parkening was played throughout the naptime. The naps (and music) typically lasted two hours in each of the classrooms. Observers (psychology graduate students) who were blind to the hypotheses of the study, were trained to record the sleep onset time in the toddlers and preschoolers. Intercoder reliability was conducted on 1/3 of the observations by two observers. The Kappa coefficient was .98 for sleep onset time.

RESULTS

A repeated measures analysis of variance was conducted with the average of the sleep onset times for the non-music days versus the music days as the repeated measure and the age (toddlers vs preschoolers) as the between groups measure. A main effect for groups suggested that the latency to sleep was significantly shorter in the toddlers vs the preschoolers ($F(1,22) = 4.82, p < .05$) (see Table 1). A repeated measures effect suggested that the latency to sleep was significantly shorter following the presentation of music than the no music condition ($F(2,21) = 4.11, p < .05$). A group by repeated measures interaction effect suggested that the toddlers went to sleep faster following music than the preschool group ($F(2,21) = 3.94, p < .05$). The toddlers went to sleep on average 35% faster following music, while the preschoolers went to sleep only 19% faster following the music condition.

DISCUSSION

It is perhaps not surprising that the children, both the toddlers and preschoolers in this study, went to sleep faster following their exposure to classical guitar music than to no music inasmuch as alpha waves have been noted to increase during the presentation of music in at least one of the studies (Malyrenko *et al.*, 1996). The increase in alpha activity was typically indicative of a relaxation response in its most extreme form since alpha activity is noted to increase during sleep. The relaxation

Table 1 Mean Sleep Onset Time (in minutes) During Naptime Music (no music) for Toddlers and Preschoolers

	Music	No Music	<i>p</i>
Toddlers	16.9	26.0	.05
Preschoolers	30.0	37.9	.05

state that accompanies music might also be contributing to the enhanced attentiveness to teachers during music noted by Nichols and Honig (1995) and the enhanced responsiveness to peers noted in the study by Godeli (1996). A state of relaxation might enhance attentiveness and/or sleep depending where the child is on the sleep-wake behavior cycle. If the children are sleeping better, attending more to their teachers and being more socially interactive with their peers, they are also likely to be experiencing an easier time learning, which may in turn relate to their better performance on math problems and their enhanced reading following prolonged exposure to music (Lamb & Gregory, 1993). As it is now accepted that young children can learn during sleep, it would not be surprising that young children would come to detect melody changes and understand the emotional meaning of music at an early age.

The longer latency to sleep by the preschool age children and the lesser impact of music on altering their sleep latency may relate to preschoolers being less ready to take naps during school hours. It is possible that, like massage therapy in a related study by Field *et al.* (1996) music would facilitate sleep in preschool age children at the regular evening bedtime.

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