

ENHANCEMENT OF VISUAL PURSUIT IN NEWBORN INFANTS BY MUSIC REINFORCEMENT.

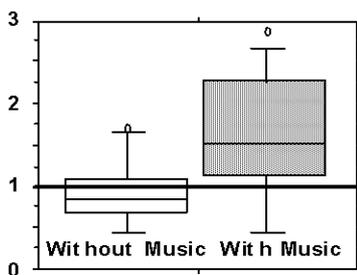
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Purpose : In this work we evaluated if the newborn ability to track a target smoothly can be increased by an operant procedure based on music reinforcement.

Method: Eye movements of 20 newborn infants were recorded with an infrared technique during the presentation of a grating moving along a horizontal axis at a velocity of 7deg/sec. Infants were first examined at the age of two days without reinforcement. During the following days, a first group of 10 infants was recorded with music delivered as soon as the child exhibited smooth pursuit with a velocity gain higher than 0.1. For the others children (group2), sessions were without music. From the records showing a tracking of the target, we calculated the percentage of tracking time with a positive gain with respect to the duration of each trial



Results: The evolution of the performance was evaluated by comparison of the score obtained at session1 and of the mean of scores obtained at session 2, 3 and 4. Our result indicates a significant difference between the infants who received music and the other ones (Mann Whitney U=27 p=0.08). The average ratio was 1.55 for group1 and 0.92 for group2. 8 over 10 newborns in group1 increased their performances against 3 in group2

Conclusion: Enhancement of smooth pursuit by music seems to be effective at birth. However we do not know if this result is the consequence of an augmentation of the level of attention induced by auditory stimulation or the result of an operant procedure. To answer to this question, it will be necessary to compare our result with result obtained on a third group when the music is delivered randomly.

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Purpose

In this work we evaluated if the newborn ability to track a target smoothly can be increased by an operant procedure based on music reinforcement.

Method and Subjects

Eye movements of 20 newborn infants were recorded with an infrared technique [1,2,3,4] during the presentation of a grating moving along a horizontal axis at a velocity of 7deg/sec. Infants were positioned facing the display screen in a baby's reclining seat (figs 1, 2). Trial duration was of 30 seconds and all viewing was binocular.

Infants were first examined at the age of one or two days without reinforcement. During the following days, a first group of 10 infants (group 1) was recorded with music delivered as soon as the child exhibited smooth pursuit with a velocity gain higher than 0.1. Figure 3 shows an example of music delivery (in green at the upper trace in relation with the visual tracking).

For the others children (group2), sessions were without music.

The number of session was between 4 and 7 and the number of recordings during one session varied between 2 to 5.

Data Analysis

From all the records showing a tracking of the target, we calculated for each session the mean percentage of tracking time with a positive gain with respect to the duration of each trial.

Figures 4 and 5 show you 4 examples of eye movement recordings obtained at sessions 1,2,3 and 4. Figure 4 refers to an infant from the group1 and figure 5 to an infant from the group 2.

Results

The evolution of the performance was evaluated by comparison of the mean of scores obtained at session 2, 3 and 4 and the score obtained at session1 (ratio).

In figure 6, ratio obtained for the 20 infants is are plotted.
8 over 10 newborns in group1 increased their performances against 3 in group2.

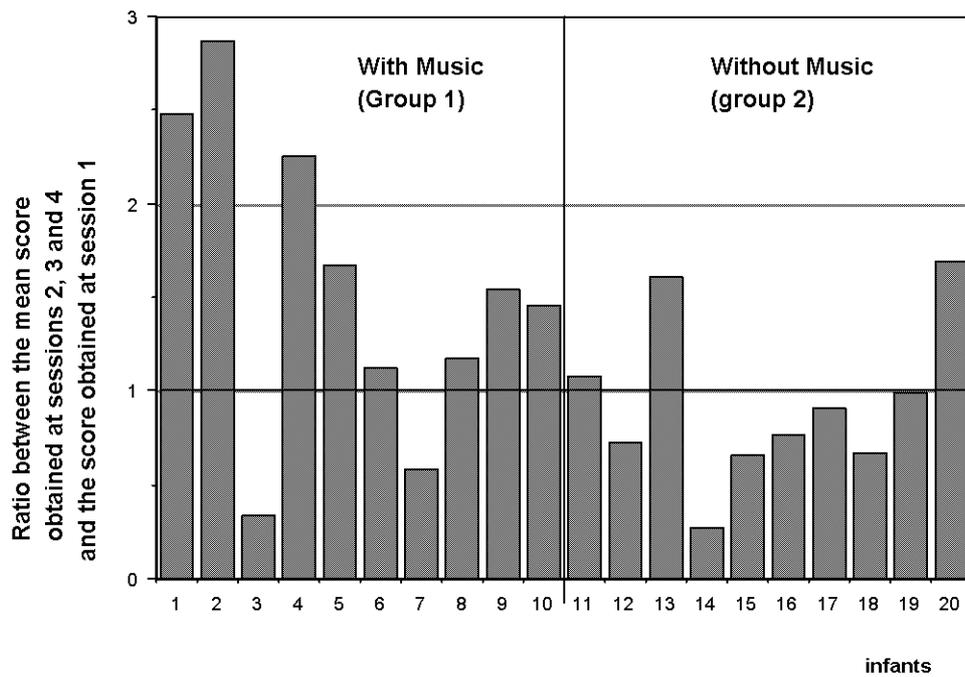
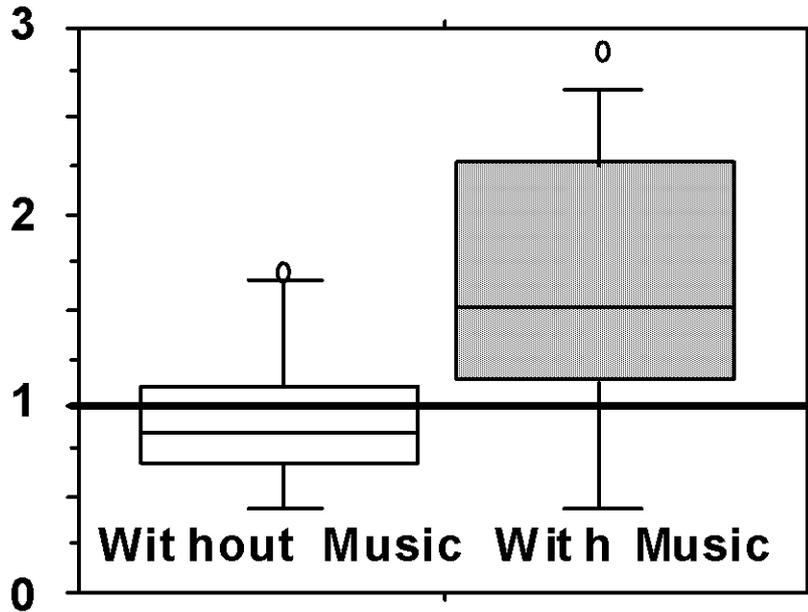


Figure 6 - Scores obtained for group 1 (left side) and group 2 (right side)

The average ratio was 1.55 for group1 and 0.92 for group2. Our result indicates a significant difference between infants who received music and the other ones (Mann Whitney $U=27$ $p=0,08$).



Conclusion

Enhancement of smooth pursuit by music seems to be effective at birth. However we do not know if this result is the consequence of an augmentation of the level of attention induced by auditory stimulation or temporal correspondence between vision and audition as Hainline suggested it in reference 4 or the result of an operant procedure.

References

- 1- BUQUET C., DESMIDT C., CHARLIER J. R., QUERLEU D. (1992). Evaluation des capacités de discrimination spatiale des enfants nouveau-nés par la poursuite visuelle de tests structurés. *C.R. de l'Académie des Sciences.,Paris*, 314, Série III, 133-140.
- 2- CHARLIER J.R., HACHE J.C. New instrument for monitoring eye fixation and pupil size during the visual field examination. *Med. Biol. Eng. Comput. BME* 1982, 20, p.23-28.
- 3- HAINLINE L. An automated eye movement system for use with human infants. *Behav. Res. Meth. Instr.* 1982, 13 20-24.
- 4- HAINLINE L. Oculomotor control in human infants. in *Eye movements and human Information Processing*. Groner, Mc Conkie and Menz Editors. Elsevier Publishers (North Holland) 1985 p. 71-84.