

Abstract of

The Effects of Auditory Integration Training on Children Diagnosed with Attention Deficit/Hyperactivity Disorder: A Pilot Study

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The purpose of this pilot study was to examine the effects of the Bérard Method of Auditory Integration Training on children diagnosed with Attention Deficit/Hyperactivity Disorder. This double blind study included ten children between the ages of six and eleven. The children were randomly assigned to either the experimental group or the control group. The five children in the experimental group listened to classical music that was electronically processed to facilitate modulation by the Audiokintron, an electronic device developed by French physician, Guy Bérard, M.D. The five other children, constituting the control group, listened to the same music without any special processing or modulation.

Prior to commencement of the listening sessions, a licensed audiologist was instructed by the investigator to complete an audiogram on all the children using examination parameters recommended by Guy Bérard, M.D. The investigator then administered the Auditory Continuous Performance Test (ACPT) by Robert W. Keith, Ph.D. to all subjects. The ACPT is an auditory vigilance test used to diagnose AD/HD in children between the ages six and eleven by detecting the presence of auditory attention deficits. This test yields performance scores based on several parameters, including impulsivity and inattention--the two main parameters which were the focus of this study. Following the audiometric examinations, the investigator made notch-filtering recommendations for all experimental subjects consistent with the Bérard protocol. The appropriate auditory stimuli were administered to both groups over the first ten half-hour sessions. Audiometric examinations were administered to all subjects at the end of ten sessions for the purpose of re-setting of filters for the experimental subjects, as necessary. Final audiometric examinations were administered to all subjects after all twenty half-hour sessions had been completed. The author then administered the ACPT examination of each subject. Three-month follow-up audiometric and auditory vigilance examinations were also administered. The author hypothesized that, at the end of three months, the experimental group would show a significant improvement in auditory attention and that the control group would not.

Comparisons from pre-experiment scores to scores obtained three months after the listening sessions indicated the following. The control subjects showed no improvements when their three months post experiment performances were compared to their pre-experiment scores relative to impulsivity, inattention and total errors. The experimental subjects showed statistically significant improvement in all areas when their pre- and three months post-experiment scores were compared with regard to impulsivity, inattention and total errors. The two group's scores, which were obtained immediately before the listening sessions, were compared to those obtained three months after the listening sessions. These analyses showed that the experimental group had improved performance relative to the control group. When the scores of the two groups were compared, the experimental group's performance was analyzed as follows. Impulsivity errors were diminished by a significant, but statistically unreliable, amount; inattention scores improved, though not significantly (this analysis was unreliable due to the number of tied scores). However, the total number of errors had decreased by a statistically significant amount.

The significance of these results must be cautiously viewed within the limitations of this pilot study. The study included a very small number of subjects. The groups' sizes influenced the choice to use a one-tailed analytical approach. Although the Wilcoxon and Mann-Whitney statistical tests are reliable indicators of statistical significance, the one-tailed approach yields a more liberal estimation of significance. The Auditory Continuous Performance Test is limited to measurement of auditory vigilance over the relatively short time span of approximately twelve minutes. The ACPT age range for which it has been scientifically validated limited the age of subjects. Medication taken by some subjects was a variable that may have influenced the performance of some subjects. The music used was limited to a specially engineered collection of classical music.

The author recommends that future studies include larger groups of experimental and control subjects. Larger groups would enable more reliable statistical analyses using two-tailed approaches with more conservative P-values. The reliability of the ACPT is validated for children between the ages of six and eleven. Studying a larger population of children beginning when they are in the six to seven year old age range, and following them until they are ten or eleven years old, would enable an evaluation of the longer term effects of AIT. The author suggests that the results of this pilot study may provide the groundwork for such a study.

The author concludes that Auditory Integration Training, as viewed within the context of this pilot study, significantly enhances the educational potential of children with Attention Deficit/Hyperactivity Disorder.

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Auditory Continuous Performance Test (ACPT) Scores

Experimental Subjects - Before

ID#	Age/Gender	Pass/Fail	Inattention Errors	Impulsivity Errors	Total Errors
3	8 M	Pass	8	11	19
1	11 M	Fail	25	18	43
104	6 M	Fail	39	41	80
107	9 M	Fail	15	22	37
106	11 M	Fail	10	11	21
		Mean	19.4	20.6	40
		Median	15	18	37

Control Subjects - Before

ID#	Age/Gender	Pass/Fail	Inattention Errors	Impulsivity Errors	Total Errors
2	8 M	Fail	19	24	43
5	11 M	Pass	7	8	15
110	8 F	Fail	40	21	61
112	10 M	Fail	14	16	30
109	10 F	Fail	14	11	25
		Mean	18.8	16	34.8
		Median	14	16	30

Experimental Subjects - After

ID#	Age/Gen.	Pass/Fail	Inattention Errors	Impulsivity Errors	Total Errors
3	8 M	Pass	4	4	8
1	11 M	Fail	13	14	27
104	6 M	Fail	20	20	40
107	9 M	Pass	1	2	3
106	11 M	Pass	7	4	11
		Mean	9	8.8	17.8
		Median	7	4	11

Control Subjects - After

ID#	Age/Gen.	Pass/Fail	Inattention Errors	Impulsivity Errors	Total Errors
2	8 M	Pass	10	12	22
5	11 M	Fail	8	10	18
110	8 F	Fail	48	12	60
112	10 M	Fail	14	5	19
109	10 F	Pass	7	8	15
		Mean	17.4	9.4	26.8
		Median	10	10	19

Experimental Subjects - 3-Months After

ID#	Age/Gen.	Pass/Fail	Inattention Errors	Impulsivity Errors	Total Errors
3	8 M	Pass	3	4	7
1	11 M	Pass	3	2	5
104	6 M	Pass	2	4	6
107	9 M	Pass	0	1	1
106	11 M	Pass	1	0	1
		Mean	1.8	2.2	4
		Median	2	2	5

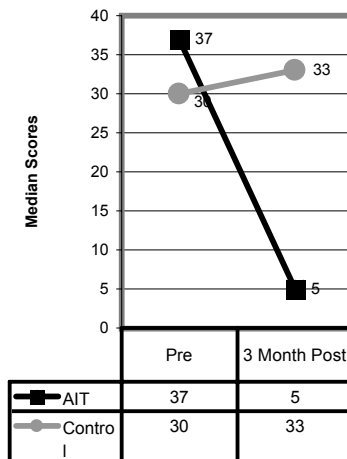
Control Subjects - 3-Months After

ID#	Age/Gen.	Pass/Fail	Inattention Errors	Impulsivity Errors	Total Errors
2	8 M	Fail	20	23	43
5	11 M	Pass	4	6	10
110	8 F	Fail	22	11	33
112	10 M	Fail	15	19	34
109	10 F	Pass	2	4	6
		Mean	12.6	12.6	25.2
		Median	15	11	33

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Auditory Continuous Performance Test (ACPT)
 by Robert W. Keith, Ph.D.
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 San Antonio, Texas USA



Total Error Scores: Pre and 3 Month Post