

BEHAVIOR & ACADEMIC PERFORMANCE OF ADD STUDENTS

Seven-Year Followup of Behavior and Academic Performance  
of Attention Deficit Disordered Students

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## Abstract

A data set of 216 children were taken from the study of 369 children who were examined for behaviors associated with attention deficit disorder. The data were collected on the children in second, fourth and fifth grades and subsequent academic performance was measured in ninth grade. The ninth grade records showed that children identified as showing attention deficit disorder behavior performed poorly in school, had lower IQ score and had poorer social adjustment. A subgroup to the sample set of 216 students who were favorably rated by their elementary school teachers showed better performance in academic areas as compared to the rest of the group.

## Seven-Year Followup of Behavior and Academic Performance of Attention Deficit Disordered Students

Many research has been done on the field of attention deficit disorder. This research tries to predict the academic performance and behavior of the children identified by their teachers as showing attention deficit disorder syndrome. The research checks the chances of children showing the attention deficit disorder, repeating one or more grade, showing social adjustment problem and dropping out of high school. Also, the research checks on the chances of students who are rated more favorably by their teachers, of exceling in academic performance and having high IQ scores. This research is significant because it takes data of same students over the period of seven years. Though there is certain amount of subjectivity involved by the elementary teachers (Corners,1969), this subjectivity is nullified as different teachers rate the same people thrice, in grade two, grade four and grade five.

### Method

#### *Participants*

Participants were 216 students (54% boys, 46% girls) from one of 18 schools in northwestern Vermont. The schools were chosen in such a way to produce a reasonable cross section of rural schools within 40 miles of Burlington, Vermont. Age at first assessment, family background, racial/ethnic identity and other background variables were not assessed.

#### *Procedure*

All participants were part of a larger study conducted by Howell, Huessy, and Hassuk (1985). The original study began with 501 children in the second grade and consisted of six

stages of data collection: 2nd grade, 4th grade, 5th grade, 9th grade, 12th grade, and three years post graduation. The first three assessments were collected via the child's current teacher, the second two assessments were collected via school records and the final assessment was an extensive interview. Due to normal attrition, the sample size was reduced to 352 children by the end of the fifth grade. The present study utilizes data collected during all six collection periods and includes only those for whom complete data is available (N = 216).

### *Measures*

*Gender.* The gender of the child was collected via a questionnaire completed by the child's second grade teacher.

*Grade Repetition.* Whether or not the child repeated a grade during high school was assessed via school records at the end of the 12th grade.

*English Level.* The level of English class the child was enrolled in was assessed via the school record in the ninth grade. The three categories were: remedial, general and college preparatory.

*English Grade.* The grade the child received in English during the ninth grade was assessed via school records. Grades were: A, B, C, D, or F.

*Social Adjustment Problems.* Whether or not the child exhibited any social adjustment problems in the ninth grade was assessed via school records. A child was considered to have a social adjustment problem if there were at least two notations in the record of infractions like disruptive classroom behavior, truancy, or setting fires in trash cans.

*High School Dropout Status.* Whether or not the participant dropped out before completing high school was obtained from the interview conducted approximately three years post high school graduation.

*ADD-like Behavior Score.* ADD-like behavior score is the average of three scores obtained during the second, fourth and fifth grades. Each child's current teacher was asked to complete the form. The diagnostic instrument was a 21-item questionnaire that tapped behavioral components commonly associated with ADD. Teachers rated each child on a scale from 1 (low behavior) to 5 (high behavior), where 3 indicated an "average" level of behavior. For each of the three assessments, the 21 items were summed to obtain a total score. The score used in the present study reflect an average of these three assessments. Howell et al. (1985) report high reliability (Cronbach's alpha ranged from .93-.96 across the three assessments), and good validity for the measure.

*Intelligence Quotient (IQ).* IQ was assessed via a group administered Intelligence Test.

*Grade Point Average (GPA).* Overall high school GPA was collected from school records at the end of the 12<sup>th</sup> grade. GPA was calculated using the following scale: A=4, B=3, C=2, D=1, F=0.

## Results

### *Descriptive Statistics*

The data was segregated into three groups, Low, Normal and ADD (Attention Defeciet Disorder) based on the average ADD like behavior scores of the students. The 20<sup>th</sup> and 80<sup>th</sup> percentile of the ADD like behavior score were 42.8 and 62.0 respectively. The students falling to less than 20<sup>th</sup> percentile (ADD score less than 42.8) were put in 'Low' group. The students

falling in more than 80<sup>th</sup> (ADD score greater than 62) percentile were put in 'ADD' group and the remaining were put in 'Normal' group.

Descriptive statistics for the variables used in this study are provided in Table 1.

Table 1

*Descriptive statistics of the variables*

Variables	Mean	Std. Deviation	N
Gender	1.4630	.49978	216
Repeated Grade?	.0926	.29053	216
Social Adjustment Problems in 9th Grade?	.1157	.32066	216
Dropped out of High School?	.0926	.29053	216
IQ Score	102.3542	12.55762	216
GPA in 9th Grade	2.4386	.84507	216

Table 2

*Academic and Behavioral Performance of the Three Groups*

Variables	Groups		
	Low	Normal	ADD
<b>General Data</b>			
No. of students	43	131	42
Males (%)	37	52	78
Mean IQ	114.93	101.61	91.56
Repeated 1 or more grades (%)	2	5	25
<b>9th Grade english level</b>			
College preparatory (%)	40	9	0
General (%)	48	79	68
Remedial (%)	12	12	32
<b>9th Grade english Grade</b>			
F Grade (%)	0	1	4
D Grade (%)	0	8	30
C Grade (%)	23	44	30
B Grade (%)	51	37	28

A Grade (%)	26	10	8
Mean 9th Grade GPA	3.1	2.42	1.87
Social adjustments problem (%)	0	10	30
Dropped out of High school (%)	0	9	23

From the above table we can see that male percentage is relatively low in the Low group and the male percentage is high in ADD group. Students in Low group have tendency of taking college preparatory courses while remedial english is preferred by ADD group. Also A grade is secured by Low group compared to other groups and F grade by ADD group.

#### *Results for t Test*

The two groups Normal and ADD's mean were compared on 'grade repetition', 'social adjustment problem' and 'dropped out of high school' variables. As the equality of the variance of the groups were not certain, two-independent samples t test was conducted to check the following hypothesis.

Null Hypothesis ( $H_0$ ): The mean of 'repetition of one or more grade' of group Normal and group ADD is equal.

Alternative Hypothesis ( $H_1$ ): The mean of 'repetition of one or more grade' of group Normal and group ADD are different.

From the Table 3 in the Appendix it can be seen that the F test of sample variances has a probability that is less than 0.05. Accordingly,  $H_0$  was rejected, and the t test based on the 'equal variances not assumed' was used. The significance level '0.007' was less than significance level of '0.05'. Therefore, null hypothesis of equal means was rejected. The mean of ADD group was much higher than that of Normal group, hence, we infer that the likelihood of students repeating

one or more grade is higher for students belonging to ADD group as compared to the normal group.

Null Hypothesis ( $H_0$ ): The mean of 'social adjustment problem' of group Normal and group ADD is equal.

Alternative Hypothesis ( $H_1$ ): The mean of 'social adjustment problem' of group Normal and group ADD are different.

From the Table 3 in the Appendix it can be seen that the F test of sample variances has a probability that is less than 0.05. Accordingly,  $H_0$  was rejected, and the t test based on the 'equal variances not assumed' was used. The significance level '0.016' was less than significance level of '0.05'. Therefore, null hypothesis of equal means was rejected. The mean of ADD group was much higher than that of Normal group, hence, we infer that the likelihood of students facing social adjustment problems is higher for students belonging to ADD group as compared to the normal group. The result is in accordance with the research done by Lambert, Sandoval & Sassone (1978) and Loney, Whaley & Kosier (1981).

Null Hypothesis ( $H_0$ ): The mean of 'dropped out of high school' of group Normal and group ADD is equal.

Alternative Hypothesis ( $H_1$ ): The mean of 'dropped out of high school' of group Normal and group ADD are different.

From the Table 3 in the Appendix it can be seen that the F test of sample variances has a probability that is less than 0.05. Accordingly,  $H_0$  was rejected, and the t test based on the 'equal variances not assumed' was used. The significance level '0.063' was higher than the significance level of '0.05'. Therefore, null hypothesis of equal means was not rejected. Hence it can not be

inferred that students in ADD group have higher chances of dropping out of high school as compared to Normal group.

*Results for Analysis of Variance (ANOVA)*

One way ANOVA was used for the comparison of means of 9<sup>th</sup> grade GPA and the IQ score of Low, Normal and ADD group because the independent variable had more than 2 groups. Following hypothesis were tested using ANOVA.

Null Hypothesis ( $H_0$ ): The mean of '9<sup>th</sup> grade GPA' of group Low, group Normal and group ADD is equal.

Alternative Hypothesis ( $H_1$ ): The mean of '9<sup>th</sup> grade GPA' of group Low, group Normal and group ADD are different.

From the Table 4 in the Appendix it can be seen that the critical value of F is 3 for degrees of freedom of 2 and 213, which is less than the calculated value of 29.72. Hence we reject the null hypothesis. Further the mean GPA of the group Low, Normal and ADD are 3.10, 2.42 and 1.87 respectively. Thus it can be inferred that the chances of student belonging to Low group scoring high GPA and students belonging to ADD group scoring relatively low GPA is high.

Null Hypothesis ( $H_0$ ): The mean of 'IQ score' of group Low, group Normal and group ADD is equal.

Alternative Hypothesis ( $H_1$ ): The mean of 'IQ score' of group Low, group Normal and group ADD are different.

From the Table 4 in the Appendix it can be seen that the critical value of F is 3 for degrees of freedom of 2 and 213, which is less than the calculated value of 55.12. Hence, we

reject the null hypothesis. Further the mean IQ score of the group Low, Normal and ADD are 114.93, 101.61 and 91.56 respectively. Thus it can be inferred that the chances of student belonging to Low group scoring high IQ and students belonging to ADD group scoring relatively low IQ is high.

Table 3

*One way ANOVA of IQ and GPA by Group*

		Sum of Squares	df	Mean Square	F	Sig.
IQ Score	Between Groups	11563.512	2	5781.756	55.124	.000
	Within Groups	22340.645	213	104.886		
	Total	33904.156	215			
GPA in 9th Grade	Between Groups	33.503	2	16.752	29.725	.000
	Within Groups	120.037	213	.564		
	Total	153.540	215			

### *Results for Correlation*

From Table 6 in Appendix, it was seen that high GPA had strong correlation with the IQ scores and dropping out of school at high school level had strong correlations with social adjustment problem.

### Discussion

From the research findings we see that the chances of students showing attention deficit disorder syndrome is relatively higher as compared to the students showing normal behavior in repeating a grade and showing social adjustment problem. Further striking difference was found between the ADD group and the Low group with respect to the IQ score and average GPA. This research shows that early identification of the attention deficit disorder behavior and steps taken

to rectify the disorder can help the students to perform well in their future academic performance and socially acceptable behavior.

#### References

- Conners, C.K. (1969). A teacher rating scale for use in drug studies with children. *American Journal of Psychiatry*, 126, 884-888.
- Howell, D.C., Huessy, H.R. & Hassuk, B. (1985). Fifteen-Year Follow-up of a Behavioral History of Attention Deficit Disorder. *American Academy of Pediatrics*, 76.
- Lambert, N.M., Sandoval, J & Sassone, D. (1978). Prevalence of hyperactivity in elementary school children as a function of social system definers. *Journal of Orthopsychiatry*, 48,446-463.
- Loney, J, Whaley-Klahn, M.A. & Kosier, T. (1981). *Hyperactive boys and their brothers at 21: Predictors of aggressive and antisocial outcomes*. Presented at the meeting of the Society for Life History Research, Monterey, CA.

## Appendix

## SPSS Syntax and Output Files for the Final Project

*Descriptive Statistics*Table 1 *Academic and Behavioral Performance of the Three Groups*

	Groups		
	Low	Normal	ADD
<b>General Data</b>			
No. of students	43	131	42
Males (%)	37	52	78
Mean IQ	114.93	101.61	91.56
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Mean 9th Grade GPA	3.1	2.42	1.87
Social adjustments problem (%)	0	10	30
Dropped out of High school (%)	0	9	23

*t Test*Table 2 *Group Statistics for Independent t Test*

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
Social Adjustment	3.00	42	.2857	.45723	.07055
Problems in 9th Grade?	2.00	131	.0992	.30013	.02622
Gender	3.00	42	1.2143	.41530	.06408
	2.00	131	1.4885	.50179	.04384
Repeated Grade?	3.00	42	.2619	.44500	.06867

	2.00	131	.0611	.24038	.02100
Dropped out of High School?	3.00	42	.2143	.41530	.06408
	2.00	131	.0840	.27841	.02432

Table 3 *Independent Samples t Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
				95% Confidence Interval of the Difference						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Social Adjustment	Equal variances assumed	31.455	.000	3.054	171	.003	.18648	.06107	.06593	.30702
Problems in 9th Grade?	Equal variances not assumed			2.478	52.792	.016	.18648	.07527	.03550	.33746
Gender	Equal variances assumed	62.118	.000	-3.206	171	.002	-.27426	.08555	-.44314	-.10539
	Equal variances not assumed			-3.532	82.652	.001	-.27426	.07764	-.42870	-.11982
Repeated Grade?	Equal variances assumed	52.713	.000	3.746	171	.000	.20084	.05361	.09501	.30666
	Equal variances not assumed			2.797	48.895	.007	.20084	.07181	.05653	.34514
Dropped out of High School?	Equal variances assumed	19.593	.000	2.321	171	.021	.13032	.05615	.01948	.24116
	Equal variances not assumed			1.901	53.317	.063	.13032	.06854	-.00715	.26778

## ANOVA

Table 4 *Anova results of the IQ Score and GPA by Group*

		Sum of Squares	df	Mean Square	F	Sig.
IQ Score	Between Groups	11563.512	2	5781.756	55.124	.000
	Within Groups	22340.645	213	104.886		
	Total	33904.156	215			
GPA in 9th Grade	Between Groups	33.503	2	16.752	29.725	.000
	Within Groups	120.037	213	.564		
	Total	153.540	215			

### Correlation

Table 5 Descriptive statistics of the variables

	Mean	Std. Deviation	N
Gender	1.4630	.49978	216
Repeated Grade?	.0926	.29053	216
Social Adjustment Problems in 9th Grade?	.1157	.32066	216
Dropped out of High School?	.0926	.29053	216
IQ Score	102.3542	12.55762	216
GPA in 9th Grade	2.4386	.84507	216

Table 6 Correlation of the Variables, Gender, Repeated Grade, Social Adjustment, Dropped, IQ Score and GPA

		Gender	Repeated Grade?	Social Adjustment Problems in 9th Grade?	Dropped out of High School?	IQ Score	GPA in 9th Grade
Gender	Pearson Correlation	1	-.168*	-.162*	-.040	.251**	.348**
	Sig. (2-tailed)		.013	.017	.555	.000	.000

	Sum of Squares and Cross-products	53.704	-5.259	-5.574	-1.259	338.083	31.564
	Covariance	.250	-.024	-.026	-.006	1.572	.147
	N	216	216	216	216	216	216
Repeated Grade?	Pearson Correlation	-.168*	1	.084	.173*	-.284**	-.178**
	Sig. (2-tailed)	.013		.218	.011	.000	.009
	Sum of Squares and Cross-products	-5.259	18.148	1.685	3.148	-223.083	-9.371
	Covariance	-.024	.084	.008	.015	-1.038	-.044
	N	216	216	216	216	216	216
Social Adjustment Problems in 9th Grade?	Pearson Correlation	-.162*	.084	1	.384**	-.263**	-.281**
	Sig. (2-tailed)	.017	.218		.000	.000	.000
	Sum of Squares and Cross-products	-5.574	1.685	22.106	7.685	-227.354	-16.384
	Covariance	-.026	.008	.103	.036	-1.057	-.076
	N	216	216	216	216	216	216
Dropped out of High School?	Pearson Correlation	-.040	.173*	.384**	1	-.293**	-.323**
	Sig. (2-tailed)	.555	.011	.000		.000	.000
	Sum of Squares and Cross-products	-1.259	3.148	7.685	18.148	-229.583	-17.061
	Covariance	-.006	.015	.036	.084	-1.068	-.079
	N	216	216	216	216	216	216
IQ Score	Pearson Correlation	.251**	-.284**	-.263**	-.293**	1	.446**
	Sig. (2-tailed)	.000	.000	.000	.000		.000

	Sum of Squares	338.083	-223.083	-227.354	-229.583	33904.156	1017.560
	and Cross-products						
	Covariance	1.572	-1.038	-1.057	-1.068	157.694	4.733
	N	216	216	216	216	216	216
GPA in 9th Grade	Pearson Correlation	.348**	-.178**	-.281**	-.323**	.446**	1
	Sig. (2-tailed)	.000	.009	.000	.000	.000	
	Sum of Squares	31.564	-9.371	-16.384	-17.061	1017.560	153.540
	and Cross-products						
	Covariance	.147	-.044	-.076	-.079	4.733	.714
	N	216	216	216	216	216	216

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).