Academic Achievement of Children with Emotional Disorders Treated in a Day Hospital Program: An Outcome Study

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ABSTRACT: Reading, spelling, and arithmetic achievement of children treated in a day psychiatric hospital was examined over time. The results indicated that the majority of children fell in the average and above achievement group and progressed evenly over time. Almost none got worse and only a few made large gains. Organic impairment ratings appeared to distinguish the three performance groups within each subject area.

KEY WORDS: partial hospitalization; children; achievement.

Introduction

The purpose of the present study was to examine the academic performance of children in day psychiatric treatment. In a prospective study carried out by Zimet, Farley, Silver, Hebert, Robb, Ekanger, and Smith,[1] children who had been treated in a day psychiatric center, as a group, showed significant improvement in their reading, spelling, and arithmetic test performance from the time they began treatment to the time they were discharged. Furthermore, they maintained this improvement 18 to 24 months later at the follow-up contact. This information was obtained from analyses of teachers' ratings of academic performance (the Academic Disability Scale of Miller's

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1977 School Behavior Checklist[2]) and from the grade level scores of the Wide Range Achievement Test.[3] We realized, however, that in the analysis of the group data, the individual child's pattern of change may have been obscured. We suspected that some children improved markedly, others did not change appreciably over time, and still others may have become more impaired. We also wondered what demographic, personality, and treatment variables might be related to the children's academic performance.

It has long been established that gender, race, socioeconomic status (SES), and intelligence are related to academic performance among normal children.[4,5] Several studies have also found age to be associated with outcome among children with emotional disorders treated in day hospital settings.[6,7,8] A recent study reported by Tramontana, Hooper, Curley, and Nardolillo,[9] examined six possible determinants of reading and arithmetic achievement in 50 hospitalized child and adolescent patients who had been referred for neuropsychological assessment. They found that neuropsychological factors, more than intelligence, SES, age, gender, and severity of behavioral disturbance, contributed to an understanding of the academic performance of these children.

Based on our review of the literature, we decided to study the following personal characteristics: age, gender, race, SES, intelligence, organic impairment, and level of adjustment. In addition, we were interested in determining if academic performance at the beginning of day psychiatric treatment, could predict length of stay in day treatment.

Method

Subjects and Setting

Subjects

The subjects were 131 school-age children 6 to 14 years old, enrolled in a psychoeducational day treatment facility located in a large western city. Of the 131 children in the total sample, there were 87 with complete reading and arithmetic test scores and, of these 87, 78 had complete spelling test scores for the three time periods covered in this study: entry to day treatment (T1), discharge from day treatment (T2), and the follow-up contact 18 to 24 months following discharge (T3). For a more complete description of the children, see Tables 3, 4, and 5.

In order to determine if the obtained sample of children with complete data

in reading, spelling, and arithmetic were representative of the full sample of 131 children, a comparison of the obtained and lost samples was carried out for each of the following variables: reading, spelling, and arithmetic test scores at T1 and T2; change scores from T1 to T2; age, gender, intelligence, global level of functioning, organic impairment, and length of stay. No significant differences between the two groups were found. Thus, it was assumed that the children studied were a representative sample of the children treated at the center.

Setting

The Day Treatment Center is a day psychiatric hospital for children who are referred because of their inability to make progress in a regular school setting. Typically, they have serious behavioral and relationship problems at home and at school. Many have major psychiatric disorders such as depression, bipolar disorder, pervasive developmental disorder, severe attention deficit hyperactivity disorder, and severe conduct disorder. The treatment program is based on a psychodynamic, psychosocial, biological, developmental model. The children spend 6 hours-a-day, 5 days-a-week at the center for an average length of 19 months. Approximately 3 hours each day are spent on the direct teaching and practicing of academic skills. In addition to their schooling and the therapeutic milieu, the children receive individual and group psychotherapy and their parents are seen each week in individual, family, and/or couples therapy.

The children are placed in groups based on their level of functioning in four domains: behavior, communication, socialization, and academics. Each group consists of five or six children and is led by a teacher certified in special education and a teacher's assistant. Child and parent therapists are either professionally-trained clinicians (e.g., social workers, psychologists, and general and child psychiatrists), or trainees from these disciplines who are supervised by the clinicians on the staff.

Measures

Academic Performance

The Wide Range Achievement Test (WRAT). The WRAT[10] is a widely used standardized test that gives estimates of achievement of individuals 5 to 11 years 11 month old (Level I) and 12 years old to adulthood (Level II) in the following skills related to reading, spelling, and arithmetic respectively: recognizing and naming letters and pronouncing words out of context; copying marks resembling letters, writing one's name, and writing single words to dictation; and counting, reading number symbols, solving oral problems, and performing written computations. Thus, achievement in these areas is defined by the skills being assessed by this instrument. Adequate reliability and validity have been reported by several investigators[11,12,13,14,15] indicating that the WRAT is a reliable and valid instrument, and compares favorably with more detailed tests of academic achievement.

The test was individually administered at T1, T2, and T3 by an experienced test administrator who was familiar to the children. Only the standard scores were used to assess academic performance and change because of the many erroneous assumptions underlying the use of grade level scores.[16]

Intellectual Performance

Wechsler Intelligence Scales for Children—Revised (WISC-R). The WISC-R[17] was administered at T1 by a qualified tester. This standardized test is widely used and the reliability and validity have been demonstrated repeatedly (see the test manual for details). Three summary scores were obtained on the following scales: Verbal IQ, Performance IQ, and Full IQ. Only the Full Scale (FSIQ) score was used as the measure of cognitive performance since it has been shown to strongly relate to achievement in reading, spelling, and arithmetic.[18]

Socioeconomic Status (SES)

The six-point rating scale of parent occupations developed by Hollingshead and Redlich[19] was updated and used as the measure of socioeconomic status (SES). A "1" represented professional occupations, and a "6" represented those who were unskilled laborers and welfare recipients. SES ratings were done by agreement between the authors at the time the children entered the program.

Organic Impairment

In the absence of a standardized measure of organic impairment and from a review of the clinical literature, the following five organic impairment categories were developed by one of the investigators in 1973, at the time the data base was established:

1. None: no neurological dysfunction.
2. Perceptual-Motor dysfunction.
3. Minimal brain dysfunction without clear brain damage.
4. Chronic brain syndrome, brain damage as shown by a history of brain injury, neurological findings, abnormal electroencephalogram, or a seizure disorder.
5. Mental retardation that may or may not be associated with any of the above four categories.

Each child was assigned a category by GKF, an experienced clinician, following the intake evaluation.

Level of Adjustment

Each child was given a Global Assessment of Functioning (GAF) score (Axis 5 of *DSM-III-R*[20]) by one of the investigators following the intake assessment and acceptance into the program. The GAF considers psychological, social, and occupational functioning on a hypothetical continuum of mental

health and illness. It does not include impairment in functioning due to physical or environmental limitations. The scores are continuous, grouped in 10-point units, and range from 1-10 at the lower end (e.g., persistent danger of severely hurting self or other, or persistent inability to maintain minimal personal hygiene, or serious suicidal act with clear expectation of death), to 81-90 at the upper end (e.g., absent or minimal symptoms, good functioning in all areas, interested and involved in a wide range of activities, socially effective, generally satisfied with life, no more than everday problems or concerns).

Length of Time in Treatment

Attendance records were used to calculate the number of days each child was in the day treatment setting.

Procedures

Defining Academic Performance Groups

Some investigators have found that emotionally and behaviorally disordered children tend to perform the same across academic areas.[21,22] If this were the case, it could justify averaging their scores across subject areas in order to assign them to one overall performance level group. Before doing this, however, we decided to examine the consistency of performance across subject areas with our children. The results indicated that the three test scores were different enough so as not to combine the three academic achievement groups into one group. Reading scores were the highest and were significantly different from both spelling and arithmetic test scores (reading/spelling, T1, T2, and T3 ts = 3.84, 6.26, and 8.97, respectively; reading arithmetic T1, T2, and T3 ts = 2.65, 4.30, and 8.03 respectively, all $ps < .01$). Spelling scores were consistently higher than arithmetic test scores (ts = −.78, .16, and −1.72, respectively, all $ps < .05$). Thus, we proceeded to assign each child to a separate performance group in reading, in spelling, and in arithmetic using the following criteria for each group:

Normal and Above (NA): test scores equal to and greater than 85 (1 standard deviation below the average score to all scores above that point).

Moderately Impaired (MI): test scores between 70 and 84 (from 2 standard deviations below the mean score to 1 standard deviation below the mean score).

Severely Impaired (SI): test scores equal to and less than 69 (3 or more standard deviations below the mean score).

Defining Performance Outcome Groups

The following three performance outcome groups were identified:

Got Worse: test score decreased by at least 1 standard deviation (−15 points) from T1-T2 or T1-T3;

Progressed Evenly: test score remained within plus or minus 1 standard deviation from T1-T2 or T1-T3; and

Got Better: test score increased by at least 1 standard deviation (+15 points) from T1-T2 and T1-T3.

Data Analysis

Change Over Time

Change of achievement test scores over each of two time periods was measured using a change score (T1 minus T2 and T1 minus T3). A multivariate repeated measures design was used to test for significant main effects (performance groups and the time data were collected) and interaction effects (performance groups by the time data were collected). If significant effects were found, a one-way analysis of variance (ANOVA) was employed followed by Fischer's Least Significant Difference (LSD) multiple comparison procedure.

Relationships Between and Among Variables

Relationships between and among variables were examined using a chi square test for categorical variables and one- and two-way ANOVAs, paired *t*-tests, and/or Pearson product moment correlation coefficients for continuous variables.

Predicting Achievement Test Scores

A stepwise multiple regression analysis was utilized to predict which of the following variables at T1 contributed to reading, spelling, and arithmetic achievement test scores at T2 and T3: age, sex, race, SES, intelligence, level of functioning, organic impairment, and length of treatment.

Results and Discussion

Achievement Test Scores

The achievement test scores of the total group of children and of those in each of the three reading, spelling, and arithmetic performance groups may be seen in Table 1.

As discussed earlier in the procedures section, we found that the achievement test scores obtained by the total group differed across subject areas at each time period. Reading scores were the highest, next came spelling scores, and arithmetic scores were the lowest. This same pattern held fairly consistently across performance groups, as shown in Table 1. These data highlight the within subject and among subject variability of the achievement test scores.

Table 1
Achievement Test Scores by Academic Performance Groups and Total Group Access Time

	Normal & Above		*Moderately Impaired*		*Severely Impaired*		*Total Group*	
Time	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
			Reading Test Scores[a]					
T1	102.67	12.65	80.26	3.38	63.82	4.17	90.18	18.71
T2	100.73	13.42	78.05	7.21	70.06	11.00	89.78	17.79
T3	100.43	14.03	80.37	8.03	71.41	14.02	90.38	17.82
			Spelling Test Scores[b]					
T1	102.94	11.31	78.29	3.96	64.73	4.86	87.76	16.94
T2	95.81	12.77	74.58	7.60	67.55	9.15	83.38	15.71
T3	93.81	11.53	75.94	8.58	65.09	11.79	82.65	15.08
			Arithmetic Test Scores[c]					
T1	98.12	10.65	78.00	4.17	62.92	4.42	85.63	15.28
T2	91.12	13.42	75.30	8.52	73.09	17.96	82.63	14.92
T3	88.40	12.29	73.82	6.79	67.25	14.55	79.95	13.71

[a]Normal & Above (NA) N = 51 (58.6%); Moderately Impaired (MI) N = 19 (21.8%); Severely Impaired (SI) N = 17 (19.6%).
[b]NA N = 36 (46.1%); MI N = 31 (39.7%); SI N = 11 (14.2%).
[c]NA N = 42 (48.3%); MI N = 33 (37.9%); SI N = 12 (13.8%).

The amount of time devoted to teaching in each of these academic areas may be reflected in this ranking of scores. Traditionally, reading has received the highest time priority among the *3 Rs* in the public schools and arithmetic the lowest. Schools in treatment settings tend to follow the teaching priorities set by the public schools in their communities. Thus, in our treatment setting, a great deal of attention has been given to teaching and remediating reading and language-related subjects, possibly at the expense of arithmetic. This speculation is supported by the size of the change scores. For example, in the NA and MI performance groups, a decrease in standard scores was greatest in arithmetic, next in spelling, and least in reading (see Table 2). These findings may also suggest that both spelling and arithmetic deficits are more a reflection of neurological dysfunction and are, therefore, more resistant to intensive educational interventions than is reading. Further research is needed to determine the validity of this premise.

The achievement test scores covered a very large range. At one end

there were children who were functioning at a highly competent level; at the other end there were children who were barely literate in reading, spelling, and/or arithmetic. According to Cook,[23] this variability in academic performance is not necessarily limited to a psychoeducational treatment setting. "In the primary grades, a teacher can expect a range of from four to five years in achievement while at the intermediate level, almost the complete range of achievement is present in every grade" (p.11).

An examination of the standard deviations of the mean WRAT achievement test scores highlights another striking feature of this sample of children with serious emotional disorders. They showed a larger amount of variability in their standard test scores compared to those obtained by the WRAT standardization sample,[10] and between each academic subject's performance level groups.

As seen in the footnotes in Table 1, the achievement test scores for most of the children across subject areas were within the Normal and Above category (reading 58.2%; spelling 46.1%; and arithmetic 48.2%). The next largest group were the Moderately Impaired children, with proportions approximating those in the Normal and Above category for spelling and arithmetic. There were very few children whose scores fell in the Severely Impaired groups in all three subject areas (19.6%, 14.2%, and 13.8% respectively).

Similar findings regarding academic achievement levels have been reported by Forness, Bennett, and Tosen[22] and by Swan.[24] Forness and his colleagues found only minimal academic deficits in a group of 92 children, 7 to 12 years old, who were admitted to an inpatient ward for diagnosis and treatment. Swan examined a stratified and random sample of all the children receiving preschool, preadolescent, and adolescent day treatment services from the schools in Georgia during 1984-1985 ($N = 344$). He found the majority to be achieving at grade level. In effect, it appears that the achievement of emotionally disturbed children may not be as deficient as previously assumed.

Change Across Time Periods

Reading Performance Groups. The findings from the MANOVA demonstrate that there were significant differences in the reading achievement change scores among the Reading Performance Groups and between time periods and performance groups [$F(2,54) = 77.63$, $p < .01$; $F(4,166) = 3.62$, $p < .01$, respectively]. There were no significant differences found for time periods ($p > .05$). The univariate and multiple comparison procedures found that from entry to termination

(T1-T2), severely impaired readers had significantly higher change scores than children in the normal and above and moderately impaired Reading Performance Groups ($ps < .01$). Reading change scores from entry to followup (T1-T3) also showed significant differences between the severely impaired and the other two reading groups (normal and above, $p < .01$; moderately impaired, $p < .05$).

Spelling Performance Groups. The results of the MANOVA indicated that there were significant differences in achievement test scores among the three spelling performance groups, among the time periods, and between spelling performance groups and time [$F(2, 75) = 86.82, p < .01$; $F(2, 74) = 74.00, p < .01$; $F(4, 148) = 4.01, p < .01$, respectively]. The univariate analysis and multiple comparison procedures showed significantly higher change scores from T1-T2, for the severely impaired groups compared to the other two spelling groups (normal and above, $p < .01$; moderately impaired, $p < .05$). The T1-T3 spelling achievement change scores, again, were highest for the severely impaired group when compared to the change scores obtained by the normal and above and the moderately impaired spelling groups ($ps < .01$).

Arithmetic Performance Groups. The results of the MANOVA indicated significant differences among arithmetic performance group categories, among time periods, and between arithmetic performance groups and time periods [$F(2,84) = 54.54, p < .01$; $F(2,83) = 11.92, p < .01$; $F(4, 166) = 5.46, p < .01$, respectively]. The univariate analysis and multiple comparison procedures found that from T1-T2, the children in the severely impaired arithmetic group had higher change scores than children in either the normal and above or moderately impaired arithmetic groups ($p < .01$). From T1-T3, however, the change scores of the children in each of the performance groups were significantly different from the other two performance groups. Severely impaired children's change scores were higher than those for normal and above and moderately impaired children ($ps < .01$ and .05, respectively); and normal and above children's change scores were higher than those of moderately impaired children ($p < .05$).

All Performance Groups. Table 2 shows the distribution in outcome group categories for each academic subject by performance group and time.

The majority of children in the three performance groups in reading, spelling, and arithmetic, progressed evenly across time. They

Table 2
Distribution in Outcome Group Categories by Performance Group and Time

Subject/Time	*Normal & Above* N	%	*Moderately Impaired* N	%	*Severely Impaired* N	%
			Got Worse			
Reading						
T1-T2	4	7.8	1	5.3	0	0.0
T1-T3	0	0.0	0	0.0	1	5.9
Spelling*						
T1-T2	7	19.4	1	3.2	0	0.0
T1-T3	9	25.0	1	3.2	2	18.2
Arithmetic**						
T1-T2	9	21.4	1	3.0	0	0.0
T1-T3	14	33.3	0	0.0	1	8.3
			Progressed Evenly			
Reading						
T1-T2	45	88.2	18	94.7	13	76.5
T1-T3	47	92.2	18	94.7	12	70.6
Spelling						
T1-T2	28	77.8	30	96.8	9	81.8
T1-T3	27	75.0	29	93.5	8	72.7
Arithmetic						
T1-T2	31	73.8	30	90.9	9	75.0
T1-T3	28	66.6	32	97.0	10	83.3
			Got Better			
Reading						
T1-T2	2	3.9	0	0.0	4	23.5
T1-T3	4	7.8	1	5.3	4	23.5
Spelling						
T1-T2	1	2.8	0	0.0	2	18.2
T1-T3	0	0.0	1	3.2	1	9.1
Arithmetic						
T1-T2	2	4.8	2	6.1	3	25.0
T1-T3	0	0.0	1	3.0	1	8.3

Note. T1-T2 = Entry to discharge; T1-T3 = Entry to follow-up.
*All *p*s $< .01$ among spelling performance groups, time, and spelling performance groups by time; T1-T2 $p < .01$.
**$p < .01$ among arithmetic performance groups by time.

neither improved dramatically nor did they fall further behind. Our assumption was that if they had been left untreated, they would have fallen further behind because that is the nature of academic failure: it is cumulative unless there is a major attempt to halt the momentum downward.[23,25]

By follow-up, almost none of the children got worse and only a few large gains (see Table 2). Proportionately, there were more children in the severely impaired group who showed improvement than there were in either the normal and above or moderately impaired academic performance groups. These findings were expected in view of the regression towards the mean that occurs with extreme scores with repeated testing and among children achieving at the extreme ends of the test.[26] Counterbalancing this expectation was the assumption that the application of an intensive affective and educational treatment program would result in improved academic performance across subject areas and performance groups.

These findings elaborate the findings of the study by Zimet et al.[1] discussed in the Introduction. In that study, the children, as a total group, showed significant improvement from T1 to T2 and from T1 to T3 in the three academic subjects. The discrepancy in findings may reflect the problems associated with the use of grade level versus standard test scores considered earlier in the methods section of this paper. Another supposition is that it is the result of examining the children as a total group rather than by the more discrete performance groups as was done in the present study.

On the other hand, the overall findings regarding change in academic achievement over time are in keeping with those reported by other investigators of emotionally disturbed children in day treatment settings. In a review of these studies, both retrospective and prospective, Baenen and his associates[27] stated that improvement in academic performance was more difficult to achieve, of lesser magnitude, and of shorter duration than improvement in behavior. Furthermore, they pointed out that although most children seemed to halt declines in academic performance, few attained grade level achievement at discharge or follow-up. The small gains made in the academic domain were referred to as trivial by Winsberg and his colleagues.[21] However, the fact that it was possible to interrupt the momentum downward and to halt the further deterioration of their academic performance demonstrates that these children had improved some skills while they were in the day treatment setting.

Personal and Treatment Characteristics as They Relate to Achievement

The personal and treatment characteristics of the children in each of the three reading, spelling, and arithmetic performance groups are

presented in Tables 3, 4, and 5. Each characteristic is discussed below in terms of its relationship to achievement in the three subject areas.

Achievement and Gender, Race, Age, and Social Class

A review of the figures presented on gender and race in Tables 3, 4, and 5, indicates that there were no significant differences in the proportions of boys and girls and nonwhite and white children in any of the three academic performance groups. This finding was surprising in light of the information that many more school-age boys than girls and nonwhite than white children, in the general population, have learning difficulties.[4,5]

The mean ages of the children in each of the subject area performance groups were similar, with one exception. Children in the normal and above arithmetic performance group were significantly younger than those in the moderately impaired group ($p < .05$). This latter finding may be explained by examining the design of the arithmetic test. It appears that the tasks presented to younger children depend more on rote recall, whereas those presented to older children depend more on skills involving more complex mental processes. Children with serious emotional disorders treated in a day hospital setting have yet to master these more complex skills. Thus, one might expect that, using the WRAT, younger children from this population would demonstrate a higher level of arithmetic competence than older children.

An examination of Tables 3, 4, and 5 show that the traditionally expected relationship between social class membership and achievement found among children in the general population[4] was not found in our group of children with serious emotional disorders. Typically, as regards reading and spelling performance groups, the majority of the parents of children in the normal and above groups were in professional and skilled occupations; those in the moderately impaired group were in skilled and semi-skilled occupations; and those in the severely impaired group were either small shop owners or in skilled occupations. The picture was different for arithmetic performance groups, however. Most normal and above and moderately impaired children's parents were in occupations listed in the lower half of the 6-point scale, whereas the severely impaired children's parents were in both the upper and lower halves of the socioeconomic scale.

Achievement and Intelligence

Full Scale IQ scores were highest for children in normal and above performance groups across subject areas, followed by children in mod-

Table 3
Characteristics of the Children in Each of the Reading Performance Groups at Entry to Day Treatment

		Normal & Above	*Moderately Impaired*	*Severely Impaired*	*Total Group*
			Number and Percent		
	N	51	19	17	87
	%	58.6	21.8	19.6	100
			Age (in years)		
	M	9.33	9.44	9.23	9.33
	SD	2.22	1.72	2.24	2.11
			Gender		
Boys	*N*	37 (72.5%)	13 (68.4%)	11 (64.7%)	61
Girls	*N*	14 (27.5%)	6 (31.6%)	6 (35.3%)	26
			Race		
White	*N*	40 (78.4%)	13 (68.4%)	12 (70.6%)	65
Nonwhite	*N*	11 (21.6%)	6 (31.6%)	5 (29.4%)	22
			*Socioeconomic Class***		
1 (High)	*N*	14 (27.5%)	1 (5.3%)	0 (0.0%)	15
2	*N*	2 (3.8%)	1 (5.3%)	1 (5.9%)	4
3	*N*	5 (9.8%)	0 (0.0%)	6 (35.3%)	11
4	*N*	19 (37.3%)	6 (31.6%)	6 (35.3%)	31
5	*N*	5 (9.8%)	7 (36.7%)	3 (17.6%)	15
6 (Low)	*N*	6 (11.8%)	4 (21.1%)	1 (5.9%)	11
			*Intelligence (FSIQ)***		
	M	97.31	88.18	78.81	91.74
	SD	14.93	11.87	15.90	16.16
			*Organic Impairment***		
None	*N*	32 (62.7%)	4 (21%)	1 (5.9%)	37
PM	*N*	6 (11.8%)	8 (42.1%)	7 (41.2%)	21
MBD	*N*	9 (17.7%)	6 (31.5%)	4 (23.5%)	19
CBS	*N*	4 (7.8%)	1 (5.3%)	2 (11.8%)	7
MR	*N*	0 (0.0%)	0 (0.0%)	3 (17.6%)	3
			*Global Assessment of Functioning (GAF)**		
	M	53.47	51.11	47.94	51.87
	SD	5.84	8.37	12.40	8.23
			*Length of Stay in Treatment (in years)***		
	M	1.79	2.20	2.64	2.04
	SD	.66	.74	.75	.77

Note. PM = Perceptual Motor Dysfunction; MBD = Minimal Brain Dysfunction; CBS = Chronic Brain Syndrome; MR = Mental Retardation.
*$p < .05$; **$p < .01$

Table 4
Characteristics of the Children in Each of the Spelling Performance Groups at Entry to Day Treatment

		Normal & Above	*Moderately Impaired*	*Severely Impaired*	*Total Group*
			Number and Percent		
	N	36	36	11	78
	%	46.1	39.7	14.2	100
			Age (in years)		
	M	8.73	9.92	9.01	9.24
	SD	2.13	2.67	2.91	2.14
			Gender		
Boys	*N*	25 (69.4%)	25 (80.6%)	5 (45.5%)	55
Girls	*N*	11 (30.6%)	6 (19.4%)	6 (54.5%)	23
			Race		
White	*N*	28 (77.8%)	23 (74.2%)	9 (81.0%)	60
Nonwhite	*N*	8 (22.2%)	8 (25.8%)	2 (18.1%)	18
			Socioeconomic Class (SES)		
1 (High)	*N*	11 (30.6%)	1 (3.2%)	2 (18.2%)	14
2	*N*	2 (5.6%)	1 (3.2%)	1 (9.1%)	4
3	*N*	2 (5.6%)	3 (9.7%)	4 (36.3%)	9
4	*N*	11 (30.6%)	13 (41.9%)	1 (9.1%)	25
5	*N*	4 (11.0%)	9 (29.1%)	2 (18.2%)	15
6 (Low)	*N*	6 (16.6%)	4 (12.9%)	1 (9.1%)	11
			*Intelligence (FSIQ)***		
	M	101.54	87.73	73.30	92.25
	SD	13.58	11.63	16.26	16.36
			*Organic Impairment***		
None	*N*	26 (72.2%)	8 (25.8%)	0 (0.0%)	34
PM	*N*	4 (11.1%)	12 (38.7%)	3 (27.3%)	19
MBD	*N*	5 (13.9%)	9 (29.0%)	3 (27.3%)	17
CBS	*N*	1 (2.8%)	2 (6.5%)	3 (27.3%)	6
MR	*N*	0 (0.0%)	0 (0.0%)	2 (18.1%)	2
			*Global Assessment of Functioning (GAF)**		
	M	53.53	51.94	46.36	51.88
	SD	6.14	6.99	12.06	7.79
			*Length of Stay in Treatment (in years)***		
	M	1.78	2.00	2.68	1.99
	SD	.68	.69	.86	.76

Note. PM = Perceptual Motor Dysfunction; MBD = Minimal Brain Dysfunction; CBS = Chronic Brain Syndrome; MR = Mental Retardation.
*$p < .05$; **$p < .01$

Table 5
Characteristics of the Children in Each of the Arithmetic Performance Groups at Entry to Day Treatment

		Normal & Above	*Moderately Impaired*	*Severely Impaired*	*Total Group*
			Number and Percent		
	N	42	33	12	87
	%	48.2	37.8	13.7	100
			*Age (in years)**		
	M	8.71	10.01	9.67	9.33
	SD	1.84	1.88	2.98	2.11
			Gender		
Boys	*N*	32 (76.2%)	21 (63.6%)	8 (66.7%)	61
Girls	*N*	10 (23.8%)	12 (36.4%)	4 (33.3%)	26
Total	*N*	42 (48.3%)	33 (37.9%)	12 (13.8%)	87
			Race		
White	*N*	33 (78.6%)	23 (69.7%)	9 (75.0%)	65
Nonwhite	*N*	9 (21.4%)	10 (30.3%)	3 (25.0%)	22
			Socioeconomic Status (SES)		
1 (High)	*N*	9 (21.4%)	3 (9.1%)	3 (25.0%)	15
2	*N*	2 (4.8%)	1 (3.0%)	1 (8.3%)	4
3	*N*	2 (4.8%)	6 (18.2%)	3 (25.0%)	11
4	*N*	15 (35.7%)	13 (39.4%)	3 (25.0%)	31
5	*N*	7 (16.7%)	6 (18.2%)	2 (16.7%)	15
6 (Low)	*N*	7 (16.7%)	4 (12.1%)	0 (0.0%)	11
			*Intelligence (FSIQ)***		
	M	102.03	84.61	72.70	91.74
	SD	12.51	11.24	13.23	16.16
			*Organic Impairment***		
None	*N*	27 (64.3%)	10 (30.3%)	0 (0.0%)	37
PM	*N*	5 (11.9%)	12 (36.3%)	4 (33.3%)	21
MBD	*N*	9 (21.4%)	9 (27.3%)	1 (8.3%)	19
CBS	*N*	1 (2.4%)	2 (6.1%)	4 (33.3%)	7
MR	*N*	0 (0.0%)	0 (0.0%)	3 (25.1%)	3
			*Global Assessment of Functioning (GAF)***		
	M	54.00	53.06	41.17	51.87
	SD	5.57	5.40	13.52	8.23
			*Length of Stay in Treatment (in years)***		
	M	1.86	1.97	2.88	2.04
	SD	.68	.67	.79	.77

Note. PM = Perceptual Motor Dysfunction; MBD = Minimal Brain Dysfunction; CBS = Chronic Brain Syndrome; MR = Mental Retardation.
*$p < .05$; **$p < .01$

erately impaired and severely impaired groups, in that order. This finding was in keeping with our expectations. Also, consistent with our expectations, was the finding that while correlation coefficients between Full Scale IQ and reading, spelling, and arithmetic achievement test scores at each time period were relatively strong (*r*s = .64, .60, and .69; .67, .60, and .61; .74, .67, and .75, respectively), they were significantly weaker than those obtained by the WRAT standardization sample[10] (*r*s = .84, .77, and .78 for each subject area with all *p*s <.01).

Achievement and Organic Impairment

Organic impairment ratings appeared to distinguish the three performance groups within each subject area. While there were children with organic impairment in each of the groups, the proportions differed. Where approximately 72% of the normal and above achieving group were seen as being free of organic damage, the proportions were reversed for the moderately and severely impaired academic performance groups. For those moderately impaired academically, 74% had organic symptoms; among those who were severely impaired academically, 99% had organic dysfunctions.

Organic impairment also played an important role in two other studies we reported in 1987. In one study, the absence of organic interference was the best predictor of improvement in behavior during the period of day treatment[28] and in the other study, the presence of organic impairment at the time the child entered treatment contributed to a more dependent and less mature relationship with friends and family in young adulthood.[29] The relatively high incidence of organic impairment in this sample of children and the strong association organic impairment appears to have with competent cognitive and social functioning supports the findings by Tramontana et al.[9] discussed earlier. They found that neuropsychological factors more than intelligence, socioeconomic status, age, gender, and severity of behavioral disturbance contributed to an understanding of the academic deficits of these children.

Two earlier studies carried out by Tramontana and his colleagues also appear to be relevant here. In 1980, Tramontana, Sherrets, and Golden[30] reported high rates of neuropsychological abnormality in child and adolescent psychiatric patients without known brain damage. Later, Tramontana and Sherrets,[31] using two neuropsychological test batteries, examined 20 hospitalized child and adolescent psychi-

atric patients where there was neither a documented history of a neuropathological condition nor positive findings on a routine neurological examination. At least 50% were identified as neuropsychiatrically impaired.

Tramontana et al.[9] also reported that neurological dysfunction was associated with global adjustment. The results of our Pearson correlation coefficients between entry organic impairment ratings and GAF scores support this view ($rs = -.54, -.50$, and $-.54$ for reading, spelling, and arithmetic respectively, all $ps < .01$).

Achievement and Global Assessment of Functioning

Most of the children in normal and above and moderately impaired groups and those in moderately impaired and severely impaired groups were similar in their level of functioning scores across subject areas. On the other hand, normal and above and severely impaired (most academically competent vs. least academically competent) children's Global Assessment of Functioning scores differed significantly in the three academic subjects ($ps < .05, .05$, and .01 respectively), not a surprising finding.

Achievement and Length of Treatment

A shorter stay in treatment appeared to be significantly and moderately correlated to high achievement test scores (average $rs = .43, .43$; and .42 for reading, spelling, and arithmetic respectively; all $ps < .01$), Full Scale IQ scores at entry ($r = .48$, $p < .01$), and to an absence of organic impairment ($r = .53$, $p < .01$). These data suggest that children with more severe academic deficits are likely to require a longer stay in day treatment than those who are more cognitively and socially competent.

Predicting Achievement at Discharge and at Follow-up

The following T1 variables were entered into three separate stepwise multiple regression analyses in an attempt to predict achievement test scores at the time the child left day treatment and at follow-up, 18 months to two years following discharge: reading, spelling, or arithmetic test scores each with organic impairment ratings, SES ratings, Global Assessment of Functioning scores, and Full Scale IQ

scores. The results supported the concept of *prediction forecasting*, i.e., that the child's achievement status at entry is the best predictor of his or her achievement status at outcome (p. 35).[23] In other words, reading and spelling test scores and organic impairment ratings at entry to day treatment were the best predictors of reading test scores at discharge and at follow-up. Spelling test scores and organic impairment ratings functioned as predictors of spelling test scores at discharge, whereas spelling test scores and the Global Assessment of Functioning scores at entry were the strongest predictors of spelling test performance at follow-up. For arithmetic, both the test scores and FSIQ scores at entry to day treatment were the best predictors of test performance at discharge and at follow-up.

Summary and Conclusions

Summary

Reading, spelling, and arithmetic achievement of children treated in a day psychiatric hospital was examined over time. Children were placed in three academic performance groups at entry on the basis of their test scores in each academic area. A multivariate repeated measures design was used to test for significant main and interaction effects. A stepwise multiple regression analysis was employed to predict the degree to which gender, race, socioeconomic status, intelligence, organic impairment, and length of stay contributed to achievement test scores at termination of treatment and at follow-up 18 months to two years later. The results indicated that the majority of children fell in the Normal and Above performance group of each subject area and most progressed evenly across time in all subject areas; almost none got worse; and only a few made large gains. Higher achievement was associated with higher intelligence, higher levels of functioning, an absence of organic impairment, and a shorter stay in treatment. Organic impairment ratings appeared to distinguish the three performance groups within each subject area. The single best predictor of reading, spelling, and arithmetic test scores at discharge and follow-up was achievement test scores at entry.

Conclusions

We were able to demonstrate that it is possible to halt the downward momentum caused by the cumulative effects of academic failure

for children with serious emotional disorders. We have not shown, however, that it may be possible to bring about a more dramatic positive advancement in academic performance. It is important, therefore, to examine, with more precision, what might be done to bring about greater improvement in each of the three subject areas studied here. For example, we need to examine more closely the interaction between types of psychopathology and achievement. Do children with specific psychopathological disorders have more difficulty in one subject area than in another? Is there a particular curriculum content and instructional approach that works best for children with a specified disorder? In addition to discovering what antecedent and intervening events are related to bringing about these changes, it would also be useful to get a better grasp of the length of time that is needed for a change to occur and the durability of these changes.

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