

# *Academic Achievement of K-12 Students With Emotional and Behavioral Disorders*

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**ABSTRACT:** *This cross-sectional study was conducted with a random sample of 155 K-12 students served in public school settings and established the extent to which students with emotional/behavioral disorders (E/BD) experience academic achievement deficits with attention to age and gender differences. In addition, this study examined particular types of problem behaviors related to academic achievement. Results indicate that students with E/BD showed large academic achievement deficits across all of the content areas, and the deficits appeared to be stable or worsen in the case of mathematics across age. There appeared to be no gender differences. Additionally, externalizing behaviors were related to reading, mathematics, and written language achievement; whereas, internalizing ones were not.*

**C**hildren and adolescents with emotional and behavioral disorders (E/BD) characteristically present both behavioral and achievement problems that interfere with their schooling (Epstein, Kinder, & Bursuck, 1989; Scruggs & Mastropieri, 1986; Walker, Colvin, & Ramsey, 1995; Walker & Severson, 2002). Compared to other disability groups, children and adolescents with E/BD have lower graduation rates and are less

likely to attend postsecondary school (Bullis & Cheney, 1999; Kauffman, 2001). As a result, such children and adolescents often experience a variety of problems related to education (Department of Health and Human Services, 1999). In this context, it is of interest to investigate the academic achievement skills of students with E/BD in public school settings.

Previous research on the academic status of children with E/BD in public schools has focused on three areas: (a) comparative analyses of the

academic achievement of children with E/BD with normally achieving students and those with learning disabilities or mental retardation, (b) investigations of the prevalence rates (co-occurrence) of E/BD and academic underachievement deficits, and (c) studies of the particular types of problem behavior related to academic achievement (e.g., Anderson, Kutash, & Duchnowski, 2001; Scuggs & Mastropieri, 1986). Children with E/BD consistently show moderate to severe academic achievement deficits relative to normally achieving students (e.g., Greenbaum et al., 1996; Mattison, Spitznagel, & Felix, 1998; Meadows, Neel, Scott, & Parker, 1994; Wagner, 1995). Scuggs and Mastropieri, for example, found that a sample of second-grade children with E/BD performed one or more standard deviations below normally achieving peers in vocabulary, listening comprehension, spelling, social studies, and science. Furthermore, although most researchers have focused on the reading and mathematic achievement of children with E/BD, there is some evidence to suggest that they appear to evince academic achievement deficits in all content areas (i.e., reading, math, written language, science, and social studies; Brier, 1995; Gajar, 1979; Scuggs & Mastropieri; Wilson, Cone, Bradley, & Reese, 1986).

Comparative analyses of students with E/BD and those with learning disabilities (Epstein & Cullinan, 1983; Gajar, 1979; Scuggs & Mastropieri, 1986; Wagner, 1995; Wilson, et al., 1986) and mental retardation (Gajar; Wagner; Wilson et al.) have been conducted to identify the relative adverse effect of these disabilities on academic achievement. The findings from these studies were mixed. Researchers reported that children with E/BD were more likely (Gajar; Scuggs & Mastropieri) and less likely (Epstein & Cullinan; Wagner; Wilson et al.) to show academic achievement deficits than students with learning disabilities. Similarly, the relative adverse effect of E/BD and mental retardation on academic achievement is unclear. Researchers reported that children with E/BD were more likely (Gajar) and less likely (Wagner; Wilson et al.) to have academic achievement deficits than those with mental retardation.

It is interesting to note that researchers of one study compared the academic achievement of

students with E/BD and learning disabilities over time (Anderson et al., 2001). Anderson and colleagues found that students with E/BD performed significantly better than those with learning disabilities on reading and mathematic measures in kindergarten and first grade but not in the fifth and sixth grade. Moreover, the reading achievement scores of students with E/BD did not improve over time, whereas students with learning disabilities demonstrated statistically significant improvement in the 5 years from intake to follow-up. These findings provide evidence to suggest that E/BD may have a more adverse impact on academic achievement over time than do learning disabilities.

The prevalence of academic achievement deficits among students with E/BD has also been examined by researchers (Mattison, Hooper, & Glassberg, 2002; Mattison et al., 1998). Reported prevalence rates of academic achievement deficits among students with E/BD have ranged widely from 25% to 97%. For example, Mattison and colleagues (2002) examined the outcomes of a sample of elementary and secondary students with E/BD. These researchers reported that less than 60% of children with E/BD experienced academic achievement deficits (i.e., in reading, math, or written language). In contrast, Greenbaum and colleagues (1996) found that the percentage of students ages 12 to 14 performing below grade level in mathematics was 97%. Differences in the reported prevalence rates are most likely a function of differences in the sampling procedures, measures used, and criteria for determining academic achievement deficits. In regard to the latter issue, a majority of researchers used grade equivalent scores from grade-level group administered academic achievement tests as indices for determining academic achievement deficits (Reid, Gonzalez, Nordness, Trout, & Epstein, 2003). The ordinal nature of these scores makes it problematic to rely on them as an indicator of absolute performance (Martella, Nelson, & Marchand-Martella, 1999). This issue is especially problematic in the case of grade-level group administered achievement tests.

The prevalence of academic achievement deficits (based on grade equivalent scores from grade-level group administered academic achievement tests) among students with E/BD also has



been assessed over time (Greenbaum et al., 1996; Mattison et al., 2002). Greenbaum and colleagues (1996) sampled from all youth across six states whose parents consented for participation. The percentage of students reading below grade level at intake (ages 8-11), 4 years later (ages 12-14), and 7 years after intake (ages 15-18) was 54%, 83%, and 85%, respectively. The percentage of children performing below grade level in math at intake, 4 years later, and 7 years after intake was 93%, 97%, and 94%, respectively. In a more current study, Mattison and colleagues (2002) found that the prevalence rates of academic achievement deficits among students with E/BD was 64% at intake (mean age = 8.6) and 62% 3 years later (mean age = 11.5). The findings of these studies indicate that the prevalence rates of academic achievement deficits experienced by students with E/BD remain stable or worsen over time. Of course, caution must be used in interpreting these results because the researchers used grade equivalent scores from grade-level group administered achievement tests as an indicator of the absolute performance of students with E/BD.

Researchers have recently begun to investigate the particular types of problem behaviors exhibited by children with E/BD that are related to academic achievement deficits (Barriga et al., 2002; Mattison et al., 1998). Researchers have primarily used the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* psychiatric classification system in these studies. For example, Mattison and colleagues (1998) used the *DSM-III* to examine the categories of problem behaviors that are related to the academic achievement deficits of students with E/BD. These researchers found that conduct/oppositional disorder was related to academic achievement of a convenience sample of elementary- and secondary-age students with E/BD. Moreover, researchers of the Multimodal Treatment Study (Abikoff et al., 2002) recently found that the presence of co-morbid attention deficit/hyperactivity disorder and disruptive behavior disorders were more strongly related with academic achievement deficits than other psychiatric disorders alone or in combination.

Taken together, research on the academic achievement of students with E/BD has directed attention toward a very important factor in their schooling experiences. This cross-sectional study

of the academic achievement of a random sample of 155 K-12 students with E/BD served in public school settings builds directly off this work in two primary ways. First, we used standardized scores from an individually administered norm-referenced academic achievement measure as an indicator of students' absolute academic achievement rather than grade equivalent scores from grade-level group administered achievement measures. The use of standardized scores from an individually administered achievement measure provides a more accurate estimate of the academic achievement of students across content areas and ages. In the present study we used the Woodcock-Johnson III Tests of Achievement (WJ-III; Woodcock, McGrew, & Mather, 2001) to assess the academic achievement of students. The standardized scores from the WJ-III were used to determine (a) the extent to which students with E/BD experience academic achievement deficits and (b) whether there are age and gender differences in the academic achievement of students with E/BD.

*...caution must be used in interpreting these results because the researchers used grade equivalent scores from grade-level group administered achievement tests as an indicator of the absolute performance of students with E/BD.*

Second, we used a dimensional classification system to examine the particular types of problem behaviors that are related to academic achievement. In contrast to psychiatric classification systems, dimensional systems are designed to measure the degree to which children exhibit particular behavioral syndromes or patterns on a continuum. Dimensional classification systems assume a number of behavioral traits exist and that all children possess these traits to some degree (Mash & Wolfe, 1999, p. 125). Although both systems rely on subjective judgment, dimensional classification systems are based on more reliable and empirically derived categories than psychiatric classification systems (Kauffman, 2001). In the present study we used the Teacher



Report Form (TRF; Achenbach, 1991) to determine the particular types of problem behaviors that are related to achievement. The TRF is one of the most commonly used rating scales by schools and in research of students with E/BD (Mattison, et al., 2002). The TRF measures the degree to which children and youth exhibit particular types of problem behaviors (Vignoe & Achenbach, 1998).

Based on previous research reviewed earlier, we expected the following four outcomes. First, we expected to find that our sample of students with E/BD would experience moderate to large academic achievement deficits relative to the norm sample across all content areas. Second, we expected that the academic achievement deficits of adolescents to be the same as or worse than those of children in our sample. Third, although it appears that researchers have not studied the academic achievement of girls with E/BD to date, we expected that girls and boys would experience similar academic achievement deficits because of the pervasive adverse effect of E/BD on academic achievement and other outcomes (e.g., *social adjustment, graduation rates, vocational outcomes*). Finally, we expected that attention and disruptive types of problem behaviors would be more strongly related to academic achievement than internalizing behaviors.

## METHOD

### PARTICIPANTS

One hundred and fifty-five students (K-12; 126 boys and 29 girls) receiving special education services for E/BD in a medium-size, urban school district in the Midwest served as participants in the present study. The district is relatively high achieving with above average mean standardized test (Metropolitan Achievement Test [MAT9]) scores at the third and eighth grades (e.g., third grade reading normal curve equivalent [NCE] = 75). Approximately 65% of the students with E/BD receiving special education services were eligible for free or reduced lunch. The 155 participating students were part of 260 students (20 each from kindergarten through Grade 12) who were randomly selected from all of the students

receiving special education services for E/BD. Project staff contacted the parents/guardians of the initial pool of students to explain the purpose of the study and, if applicable, obtain informed consent and child assent to participate in the project. Approximately 64% of the parents/guardians allowed their children to participate in the present study. One hundred percent of these children assented to participate in the study. This resulted in an initial pool of 166 students. Eleven of these students were not included in the analyses because IQ data were unavailable.

The grade, gender, mean age, age of onset (i.e., age when formally diagnosed as E/BD), mean WJ-III total achievement score, mean TRF Total Problem Behavior broad band score, and mean full scale IQ scores for each grade (K-12) are presented in Table 1. One hundred and thirty-three (85%) of the participants were Caucasian, 16 (11%) were African American, 3 (2%) were Hispanic/Latino, and 3 (2%) were Native American. Ethnicity was not considered in subsequent analyses because of the limited numbers of students in most of the cells. The ethnic makeup of our sample was consistent with the total population of students with E/BD served by the school district, but underrepresentative of African American and Hispanic/Latino nationally. Furthermore, the ratio of boys to girls in the sample is consistent with the total population of students with E/BD served nationally (Kauffman, 2001).

Approximately 50% of students met the recommended borderline and/or clinical cut scores on the broad band TRF Total scale. This percentage falls within the range reported in previous research conducted with students with E/BD served in public school settings (Nelson, Babyak, Gonzalez, & Benner, 2003). Twice as many students scored in the recommended borderline or clinical range on the broad band Externalizing scale (50%) than on the Internalizing scale (21%). This finding is consistent with previous investigations indicating that students with E/BD are more likely to be characterized by significant externalizing behaviors when rated by teachers (McKinney & Forman, 1982) and caregivers (Epstein, Kutash, & Duchnowski, 1998). Overall, the students participating in the present study appear to be relatively representative in terms of severity of problem behaviors of the pop-

**TABLE 1**  
*Characteristics of Participants by Grade Level*

<i>Grade/Gender</i>	<i>Mean Age</i>	<i>Mean Age of Onset</i>	<i>Mean Total Achievement</i>	<i>Mean Total Problem Behaviors</i>	<i>Mean Full Scale IQ</i>
K (5 boys)	6.28 (.42)	4.33 (1.25)	81.60 (12.12)	64.40 (9.74)	84.60 (16.55)
1st (13 boys; 2 girls)	7.10 (.40)	5.53 (.94)	96.26 (14.68)	68.07 (7.53)	96.64 (9.41)
2nd (12 boys; 2 girls)	8.01 (.39)	6.27 (1.29)	90.64 (18.93)	65.50 (6.04)	92.29 (19.29)
3rd (11 boys; 4 girls)	9.25 (.53)	6.74 (1.98)	86.40 (19.46)	66.93 (10.41)	93.87 (14.38)
4th (10 boys; 4 girls)	10.03 (.27)	7.65 (1.49)	90.43 (16.69)	70.21 (7.92)	101.79 (13.22)
5th (9 boys; 4 girls)	11.09 (.40)	7.87 (1.56)	89.62 (16.33)	62.00 (9.91)	98.46 (16.19)
6th (12 boys)	11.92 (.42)	7.82 (1.90)	92.42 (16.37)	69.83 (8.90)	101.83 (11.73)
7th (9 boys; 2 girls)	13.01 (.29)	8.48 (2.08)	82.64 (19.35)	64.82 (5.56)	92.27 (11.69)
8th (12 boys; 2 girls)	14.10 (.42)	10.46 (2.94)	88.93 (10.22)	68.34 (6.67)	94.64 (15.03)
9th (13 boys; 3 girls)	15.29 (.47)	10.26 (2.13)	87.13 (17.15)	60.31 (5.49)	96.63 (18.11)
10th (10 boys; 3 girls)	16.23 (.45)	11.92 (2.68)	88.38 (17.06)	61.54 (7.56)	97.77 (19.97)
11th (7 boys; 1 girl)	17.34 (.51)	10.48 (3.76)	81.25 (24.87)	68.25 (4.59)	100.12 (14.89)
12th (5 boys)	18.60 (1.73)	9.57 (4.08)	97.20 (23.24)	59.40 (2.07)	102.20 (24.15)



ulation of children and youth with E/BD served in public school settings. The participating students, however, appear to be underrepresentative in terms of ethnicity and overrepresentative in relation to low-socioeconomic status.

#### RESEARCH DESIGN

A cross-sectional research design (Martella et al., 1999) was used to collect information on the 155 participants within a contemporaneous 4-month time span. Data were collected February through May of the academic year on students at each grade level selected randomly from all children with E/BD receiving special education services.

#### DEPENDENT MEASURES

Three categories of dependent measures were collected: (a) social adjustment; (b) academic achievement; and (c) ethnicity, hours of special education per day, and IQ. Each student's primary special education teacher completed the social adjustment measure. Six trained data collectors administered the academic achievement measure and also conducted the student record search. A description of the dependent measures follows.

*Child Behavior Checklist: Teacher Report Form* (TRF; Achenbach, 1991) was used to measure the social adjustment of participants. The TRF consists of 118 problem items such as difficulty following directions, disturbs other pupils, and disrupts class discipline. The teacher rates the child on each item indicating the severity of the problem on a 3-point Likert-type scale ranging from 0 (no problem) to 2 (severe problem). The TRF scoring profile provides a total scale score (Total Problems), 2 broad band scale scores (Internalizing and Externalizing), and 8 narrow band subscale scores (Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior). The broad band Internalizing scale score is based on the sum of the Withdrawn, Somatic Complaints, and Anxious/Depressed scale scores. The broad band Externalizing scale score is based on the Delinquent Behavior and Aggressive Behavior scale scores. The narrow band Social Problems, Thought Problems, and Attention Problems scale scores are not included on either the broad band Internalizing or Externalizing scale scores. The TRF test-

retest and internal consistency values for the broad and narrow band scales were .62 to 0.96 and 0.72 to 0.95, respectively (Achenbach). The TRF broad and narrow band scales displayed reasonably strong internal consistency with the study participants, with Cronbach alphas ranging from .65 to .92.

*Academic Achievement.* The Broad Reading, Broad Math, Math Calculation Skills, Broad Written Language, and Written Expression clusters of the WJ-III (Woodcock et al., 2001) were used to measure the academic achievement of participants. The WJ-III subtests for each of the clusters are as follows: (1) Broad Reading (Letter-Word Identification, Reading Fluency, and Passage Comprehension); (2) Broad Math (Calculation, Math Fluency, and Applied Problems); (3) Math Calculation (Calculation and Math Fluency); (4) Broad Written Language (Spelling, Writing Fluency, and Writing Samples); and (5) Written Expression (Writing Fluency and Writing Samples). The WJ-III scoring profile provides a total achievement score (combination of 9 subtests included in the Broad Reading, Broad Math, and Broad Written Language clusters), and 5 cluster (see previously), and nine subtest scores (see previously). The Math Calculation cluster score is not included in further analyses because it includes 2 subtests (Calculation and Math Fluency) subsumed under the Broad Math cluster. The WJ-III clusters show strong reliabilities, most at .90 or higher. The WJ-III subtests show strong reliabilities of .80 or higher.

*Student Records.* The school records of each participant were searched to collect information on ethnicity, hours of special education services received per day, and mean IQ scores. With regard to IQ, the Full Scale, Verbal, and Performance scores were recorded for each of the participants. IQ was assessed using the Wechsler Intelligence Scale for Children, Third Edition (WISC-III; Wechsler, 1991) for a majority of the students.

#### PROCEDURES

*Age and Gender Differences.* Independent samples *t* tests were conducted for each of the WJ-III cluster and subtests to determine if there were statistically significant differences in the mean scores of children and adolescents as well as

boys and girls. Bonferroni corrections were used to control the overall error rate associated with multiple comparisons. Children were operationally defined as those students ranging in age from 5 to 12; whereas, adolescents were 13 to 18 years. A matched sample (grade, age [+ 6 months], TRF Total Problem Behaviors [+ one standard error of measurement], mean IQ [+ one standard error of measurement]) of 29 boys was selected randomly from the male participants for comparative analyses with the 29 girls on each of the WJ-III cluster and subtests.

## RESULTS

### *ACADEMIC ACHIEVEMENT DEFICITS*

The mean WJ-III cluster and subtest scores of students overall and by age level are presented in Table 2. Inspection of Table 2 reveals that students generally experienced large academic achievement deficits across all content areas. The effect size discrepancies for the Total, Broad Reading, Broad Math, and Broad Written Language clusters were approximately .94 in all cases. (The formula used to compute the effect sizes  $(X \text{ norm group} - X \text{ sample}) / SD \text{ norm group}$ .) This indicates that approximately 83% of students scored below the mean of the norm group across the content areas. A similar pattern was generally found on the subtests associated with each of the WJ-III clusters.

### *AGE AND GENDER DIFFERENCES*

Independent samples *t* tests were conducted to determine if the mean differences in the academic achievement of children and adolescents were statistically significant (see Table 2). The results indicate that adolescents were more likely to experience academic achievement deficits in mathematics than were children. The effect size discrepancies for adolescents and children for the WJ-III Broad Math cluster were .18 and .94, respectively. This indicates that 56% of children and 83% of adolescents scored below the mean of the norm group on the WJ-III Broad Math cluster. A similar pattern was generally found on the subtests associated with the WJ-III Broad Math cluster. Additionally, mean differences between

children and adolescents on the WJ-III reading and written language clusters and subtests were not statistically different from one another.

The mean WJ-III cluster and subtest scores of our subset of 29 boys and 29 girls are presented in Table 3. Independent samples *t* tests were conducted to determine if the mean differences in the academic achievement of boys and girls were statistically significant (see Table 3). The results indicate that the mean scores of boys and girls on the WJ-III clusters and subtests were not statistically different. This indicates that boys and girls experienced similar levels of academic achievement. A similar pattern was generally found on the subtests associated with each of the WJ-III clusters.

### *PROBLEM BEHAVIORS RELATED TO ACADEMIC ACHIEVEMENT*

Multiple regression analyses were used to assess the contribution of externalizing and internalizing problem behaviors to the prediction of reading, written expression, and mathematics achievement. We controlled for any variation due to age of onset before entering two sets of constructs into the regression formula (i.e., externalizing behavior, internalizing behavior). Regression diagnostics were conducted prior to conducting these analyses to screen data for deviant cases that may be extreme outliers and/or have undue influence on the results (Pedhazur, 1999). Influential cases have a significant effect on values of regression statistics either uniquely or in combination with other observations. In order to detect influential cases, the following regression diagnostics were examined: (a) leverage (detects cases that affect the regression line), (b) Cook's D (detects cases that are influential due to their values on Y, X, or both), and (c) Standardized DFBETA (detects cases that affect the regression coefficient). The results of the regression diagnostics indicated that there were no deviant cases or outliers that would unduly influence the results of the regression analyses. Additionally, collinearity diagnostics indicated that the predictive variables were not a linear combination of one another. The obtained condition index in all cases was  $< 10$ . A condition index of 30 to 100 indicates moderate to strong collinearity (Fox, 1991).



**TABLE 2**  
*Means Scores by Age on the WI-III*

<i>Cluster/Subtests</i>	<i>Total Students</i> (n = 155)	<i>Children (5-12)</i> (n = 88)	<i>Adolescents (≥13)</i> (n = 67)	<i>Child. vs. Adol.</i> t(153)
<i>Total</i>	89.32 (16.91)	90.49 (16.43)	87.50 (17.61)	1.07
<b>Broad Reading</b>	91.72 (14.39)	93.53 (14.96)	92.02 (14.78)	0.25
Letter-Word Identification	95.86 (14.67)	96.38 (13.22)	95.07(15.60)	0.57
Reading Fluency	92.11 (14.09)	92.98 (13.05)	90.97 (15.36)	0.84
Passage Comprehension	91.95 (11.91)	91.92 (11.37)	91.96 (12.80)	.011
<b>Broad Math</b>	93.51 (15.30)	97.30 (13.83)	87.63 (15.73)	3.99**
Calculation	94.27 (16.16)	98.76 (13.32)	87.53 (17.75)	4.42**
Math Fluency	85.51 (15.92)	88.53 (15.85)	80.98 (15.06)	2.92*
Applied Problems	96.91 (13.74)	99.64 (13.07)	92.72 (13.77)	3.13*
<b>Broad Written Language</b>	89.97 (16.99)	89.56 (16.64)	90.62 (17.64)	0.38
Spelling	93.67 (17.80)	92.96 (16.88)	94.78 (19.24)	0.62
Writing Fluency	91.70 (16.11)	92.87 (16.34)	90.32 (15.87)	0.90
Writing Samples	88.09 (17.02)	90.80 (15.38)	91.47 (17.96)	0.87

Note. \*  $p < .01$ . \*\*  $p < .001$ ; The values in parentheses represent standard deviations.



**TABLE 3**  
*Mean Scores by Gender on the WJ-III*

<i>Cluster/Subtests</i>	<i>Boys</i> (n = 29)	<i>Girls</i> (n = 29)	<i>Gender</i> t(56)
Total	90.19 (16.68)	88.62 (17.65)	1.31
Reading	92.57 (14.17)	91.06 (15.96)	1.03
Letter-Word Identification	94.28 (14.22)	93.25 (15.23)	0.98
Reading Fluency	91.82 (14.05)	89.28 (14.95)	1.19
Passage Comprehension	92.70 (13.27)	90.91 (10.68)	1.43
Broad Math	94.54 (14.63)	93.06 (17.49)	1.56
Calculation	95.00 (15.97)	93.24 (16.90)	1.42
Math Fluency	85.82 (15.82)	84.24 (16.54)	0.89
Applied Problems	97.70 (13.83)	96.39 (14.94)	0.52
Broad Written Language	90.13 (17.37)	89.28 (15.54)	1.01
Spelling	92.11 (18.05)	91.79 (16.88)	1.31
Writing Fluency	91.01 (16.35)	91.26 (15.41)	0.31
Writing Samples	87.13 (17.64)	86.93 (14.22)	0.58

Note. None of the analyses for gender were statistically significant.

The target variables for the regression analyses were the WJ-III Broad Reading, Broad Math, and Broad Written Expression cluster scores. The same two constructs were entered into each of the regression analyses. These constructs included (a) externalizing behavior (i.e., TRF Delinquent, Aggressive, and Attention Problems narrow bands) and (b) internalizing (i.e., TRF Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, and Thought Problems narrow bands). Each of these constructs was entered in the first (after age of onset) as well as the last position in the regression analysis. This enabled us to establish the initial contribution of the externalizing and internalizing constructs when the other predictors were not present (i.e., first position) and the final contribution of each construct after the other one was entered into the equation (i.e., final position). Entry in the final position allowed us to examine which of the externalizing and internalizing constructs contributed to the prediction of reading, written language, and mathematics

achievement above and beyond the contribution of the other construct. These analyses also provided information on the combined contribution of the externalizing and internalizing constructs to the prediction of reading, written language, and mathematics achievement.

In all cases, the probability of *F* to enter was  $<.05$  and to remove  $>.10$ . When all variables were entered into the regression formula, 27%, 38%, and 37% of the variance in the reading, written language, and mathematics achievement of students was accounted for (see Table 4). Only the externalizing construct contributed to the overall fit-of-the-model when entered in the first (following age of onset) or the last position in the regression analyses for reading, written language, and mathematics achievement. The TRF Aggression, Delinquent, and Attention Problem scores contributed to the prediction of reading, written language, and mathematics achievement. The *t* test for the Beta weight for this measure was statistically significant when the externalizing con-

**TABLE 4**  
*Regression Analyses for Attention and Disruptive Type Behaviors*

Construct	Initial Entry				Entry in Last Position		
	df	Simple R	F	p	R <sup>2</sup> Increment	F Change	p
<i>Broad Reading</i>							
Age of Onset	1	.05	.41	.525			
Externalizing	4	.35	6.97	.000	.14	7.74	.000
Internalizing	9	.12	0.48	.790	.03	1.21	.303
<i>Broad Written Language</i>							
Age of Onset	1	.01	.000	.988			
Externalizing	4	.42	11.21	.000	.14	8.62	.000
Internalizing	9	.19	1.83	.130	.02	0.63	.679
<i>Broad Math</i>							
Age of Onset	1	.11	.68	.123			
Externalizing	4	.37	8.15	.000	.14	7.96	.000
Internalizing	9	.13	0.54	.750	.02	0.56	.733

struct was in either the initial ( $p < .001$ ) or final position ( $p < .05$ ). Thus, overall students with E/BD who exhibit externalizing problem behaviors (i.e., aggression, delinquent, attention problems) were more likely to experience academic achievement deficits (i.e., reading, written language, mathematics) than students who evidenced internalizing ones (i.e., withdrawn, somatic complaints, anxious/depressed, social problems, thought problems).

## DISCUSSION

There are three principal findings from the present study. First, the findings revealed that, as expected for the sample as a whole, students with E/BD (both boys and girls) experienced large academic achievement deficits relative to that of the norm group. Furthermore, the academic achievement deficits of these students were broad based

in that they experienced deficits in all content areas. An effect size discrepancy of .94 was obtained for each of the WJ-III clusters. Confidence in our findings is increased because the sample was drawn from a relatively high performing school district and because we used standardized scores from an individually administered academic achievement measure to estimate the achievement levels of students. Reported prevalence rates of academic achievement deficits among students with E/BD have ranged widely from 25% to 97% (Reid et al., 2003). Thus, our findings are consistent with previous prevalence research that has found that students with E/BD are likely to experience academic achievement deficits (e.g., Greenbaum et al., 1996). Our findings (albeit tentative) that boys and girls with E/BD appear to experience similar academic achievement deficits adds to our knowledge of the academic achievement of students with E/BD. If these findings withstand future scrutiny, they sug-



gest that E/BD may have a pervasive influence on academic achievement. Of course, the results of this study and those of others do not provide any information with which to determine whether there is a causal linkage between E/BD and academic achievement.

Second, further analyses, as expected, suggest that at best, the academic achievement levels of students in our sample remained stable in reading and written language; whereas, deficits in mathematics appeared to broaden over time. One possible explanation for differences in the mathematics achievement of children and adolescents is that the students with E/BD do not take higher level mathematics coursework in middle and high school. Although we could not formally assess whether this was the case, the building-level special education coordinators indicated that many students with E/BD are enrolled in consumer mathematics courses. This explanation might apply as well to the general underachievement of students with E/BD in all academic areas. Nevertheless, our findings are generally consistent with previous longitudinal research that suggests that students with E/BD do not appear to improve academically across the age span (e.g., Greenbaum et al., 1996). Just as antisocial behavior patterns become increasingly stable and resistant to intervention efforts (Kazdin, 1993; Walker & Severson, 2002), it appears that academic deficits also may be increasingly stable (O'Shaughnessy, Lane, Gresham, & Beebe-Frankenberger, 2003). This is not to imply that academic deficits of students are solely a function of their E/BD. Rather, it is likely a function of the complex interaction between the presenting problems associated with students' E/BD (e.g., noncompliance, inattention) and the educational programs provided to them.

Finally, another purpose of this study was to identify particular types of problem behaviors that are related to academic achievement. The results indicated, as expected, that the externalizing behaviors (i.e., attention, aggression, delinquency) of students in our sample were related somewhat to their academic achievement in all content areas. These results were consistent with early investigations (Abikoff et al., 2002; Lane, Gresham, MacMillan, & Bocian, 2001; Mattison et al., 1998) that conduct (e.g., aggression, delinquency) and attention problems were related to

academic achievement. Thus, it is imperative that these students be identified as early as possible in their educational careers so that focused, academic interventions and programs can be provided to prevent these learning problems from occurring (Gresham, Lane, & Lambros, 2000).

Given the poor prognosis for remediating academic deficits over time, it is imperative that the field of special education identify effective, feasible methods of teaching academics and remediating existing academic achievement deficits (Lane & Menzies, 2002; Walker & Severson, 2002). Boys and girls alike continue to show academic deficits into the adolescent years. Not only do these deficits remain as children move into adolescence, they actually appear to broaden in the case of mathematics.

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Findings of this study also suggest the need to better serve students with externalizing problems given that these behaviors are related to the academic achievement skills of students with E/BD (Abikoff et al., 2002; Lane et al., 2001; Mattison et al., 1998). It is critical that early detection screenings be institutionalized in public schools to identify students with externalizing behavior problems so that more focused intervention support can be provided (Lane & Wehby, 2002; Severson & Walker, 2002). Without more ideographic support, these students are likely to have academic deficits continue across the age span, making service delivery at the high school level even more challenging for teachers who work with students with E/BD.

Unfortunately, few researchers have studied effective academic interventions for students with



E/BD. A historical review of the academic intervention research conducted with these students showed that only 55 studies have been conducted over the past 30 years (Mooney, Epstein, Reid, & Nelson, 2003). For example, despite the severe reading problems faced by children with E/BD, scant research has examined the effects of reading interventions designed to improve the reading skills of children with E/BD. In a review of the literature, Coleman and Vaughn (2000) identified only eight published articles assessing the effects of reading interventions for students with E/BD. Thus, there is little information on effective academic interventions for students with E/BD available to educators, parents, and others.

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As with all studies, however, this investigation is not without limitations. The first limitation involves sample size and statistical power. The modest sample size ( $n = 155$ ) prohibited the use of more sophisticated analyses to explore possible interaction effects between variables. For example, due to low cell sizes, it was not possible to conduct factorial multivariate analyses of variance to investigate interactions among variables. It would have been interesting, for example, to examine the interaction between age level (children or adolescents) and gender (male or female) to determine if the effect of age level on Broad Reading, Broad Math, and Broad Written Language was different for boys and girls (Kleinbaum, Kupper, Muller, & Nizam, 1998).

The second limitation relates to our use of a cross-sectional research design. Although this is a cost-effective research design, it does not enable the researcher to monitor progress of *the same students* across time as in a longitudinal study. A major concern in a cross-sectional study is selecting samples of students who are actually representative of others at that grade level. Students with

E/BD experience a relatively high dropout rate. It is possible that students with E/BD that are academically skilled may be disenrolled from special education services; whereas older students whose academic problems become more pronounced over time may become eligible for such services. Another concern relates to selecting samples across the grade span that are comparable on key variables (e.g., intelligence, ethnicity; Gay & Airasian, 2000). Future research could address both of these concerns by identifying a larger sample of students with E/BD and addressing these same questions within the context of a longitudinal study. This would permit higher level statistical analyses and afford researchers the opportunity to follow the academic and behavioral performance of the same sample over time and establish potential causal relationships among variables.

The third limitation is associated with the concept of multioperationalism. This essentially means using varied measures of the constructs of interest; for example, using both standardized and CBM measures of academic achievement. When assessing student performance, assessments based on the principle of multioperationalism are recommended (Gresham et al., 2000). In this study, reading achievement was assessed via a standardized measure (Woodcock-Johnson, III). It may be that fewer students would have had deficits in measures more closely linked to the district curriculum (e.g., curriculum-based measures), which tend to be more sensitive measures of monitoring students' progress relative to standardized achievement tests. Future studies could be enhanced by incorporating curriculum-based measures in addition to psychometrically sound norm referenced instruments such as the Woodcock-Johnson III.

Finally, the sample of children was drawn from one school district in one geographic location and may not be representative of the general population of public school students with E/BD. It is possible that the findings may not generalize to other groups of students (such as African Americans, Hispanics, and Asian Americans) or other geographical regions and schools. Future research should replicate these finding across varied contexts. Furthermore, 35% of parents/guardians failed to consent to their child's participation in the study. Although we were unable to detect any



differences in the characteristics between parents/guardians who provided consent and those who did not, it is unclear whether the sample was representative of the entire population of students with E/BD served by the school district.

Despite these limitations, this study confirms earlier works suggesting that a relatively large proportion of students with E/BD have academic problems (Mattison et al., 2002). The findings of this study suggest, however, that underestimates may be obtained when researchers use convenience samples (e.g., Mattison et al., 2002). Furthermore, the results also confirm that academic achievement deficits are related to externalizing behaviors such as aggression, delinquency, and attention problems (Abikoff et al., 2002; Lane et al., 2001; Mattison et al., 1998). This study also extends earlier work by assessing the generalizability of the findings using varying measures and across gender and age span variables.

#### IMPLICATIONS

With the previous limitations in mind, implications for practice are evident. Our finding that students with E/BD are likely to exhibit academic deficits very early in their school careers supports proponents of prevention programs (e.g., Nelson, Martella, & Marchand-Martella, 2002). It is important for public schools to identify academic achievement deficits of students with E/BD in order to provide effective instructional programs in a timely, efficacious manner. Unfortunately, relatively little research has been conducted with this population of students to determine if current instructional programs and interventions will work. Research in the area of reading indicates that students with E/BD may need unique instructional approaches because children with behavior problems were generally unresponsive to effective prereading and reading intervention (Al Otaiba & Fuchs, 2002; Nelson, Benner, & Gonzalez, 2003).

Our findings that students with E/BD are likely to experience academic achievement deficits in all areas suggest that instructional programs will not only have to be intensive, but also comprehensive. Additionally, our results suggest that the achievement issues of students with E/BD who exhibit externalizing deficits may be more pronounced. With these students, effective in-

structional programs may play, at least in part, a role in improving their social skills. Beyond cognitive factors (e.g., perceived competence), academic skills are likely to be reinforced by teachers and parents and, thus, act as alternatives to problem behaviors (Kohler & Greenwood, 1986).

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