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Gregory J. Benner
University of Washington

Richard E. Mattison
Stony Brook University

J. Ron Nelson
University of Nebraska - Lincoln, rnelson8@unl.edu

Nicole C. Ralston
University of Washington

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Types of Language Disorders in Students Classified as ED: Prevalence and Association with Learning Disabilities and Psychopathology

Gregory J. Benner
University of Washington

Richard E. Mattison
Stony Brook University

J. Ron Nelson
University of Nebraska

Nicole C. Ralston
University of Washington

Abstract

The purpose of this study was to determine the prevalence of four types of language disorders among public school students (N = 152) classified as Emotional Disturbance (ED). We also examined the association of the types of language disorders experienced by these students with specific learning disabilities and clinical levels of specific types of psychopathology. Nearly 66% of the students with ED experienced a language disorder, with combined receptive-expressive disorders being the most common (35.5%). Students with a language disorder, particularly combined receptive-expressive disorder, showed significantly poorer achievement and more learning disabilities (LD) in all areas compared to students with no language disorder. Furthermore, 91.3% of the students with any LD also had a language disorder. Types of language disorders were not significantly distinguished by psychopathology, although severity was serious in both students with and without a language disorder. These findings have implications for the identification and treatment of language disorders in students classified ED.

Our knowledge about language deficits in students classified by the federal special education category of Emotional Disturbance (ED) is growing. In the foremost study of language dysfunction in students classified ED (Nelson, Benner, & Cheney, 2005), a prevalence rate of 68% was found for students who met a cutoff score for a clinical language deficit with a standardized language instrument, the

Correspondence to Richard E. Mattison, MD, Stony Brook University, Putnam Hall, South Campus, Stony Brook, NY 11794-8790; email: richard.mattison@stonybrook.edu.

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CELF-3 (Semel, Wiig, & Secord, 1995). This high occurrence in these 166 students with ED was consistent with an earlier major literature review of language deficits and psychiatric disorders (Benner, Nelson, & Epstein, 2002). They found an average of 71% for any language deficit in 18 studies in which a variety of language instruments and definitions for language deficit were used in children who met either a special education or a DSM definition of emotional or behavioral disorder. In contrast, a 4 to 7% rate of language disorders has been found in the school-aged general population (Paul, 2007).

Special education does not yet, however, have much information about the types of language disorders in students with ED. Special education teachers must be aware of not only the presence of language disorders in their students but also the specific characteristics. Such knowledge can guide a teacher to more specifically help a student not only in teacher-student communication but also during peer-peer communication. At the time of the above study by Nelson and his colleagues (2005), language disorders were commonly grouped into the general categories of receptive, expressive, and a combination of receptive plus expressive (Semel et al., 1995). While the original 2005 study focused on mean CELF-III scores, Benner (2005) further defined the receptive-expressive language breakdown in the elementary school portion of the original sample. The following percentages of the 84 grade-school participants scored ≤ 85 (at least one standard deviation below the mean [1 *SD*]) on each composite score of the CELF-3: 42% Receptive Language, 55% Expressive Language, and 54% Total Language. Overall, 67% achieved at least one composite score in the clinical range, including 32% on all three scores. Thus, combined receptive-expressive deficits appeared in some children and individual deficits in others, but the distribution of deficits for individual students with ED was not determined at that time. Furthermore, the occurrence of types of language disorders has not been described in any other study of students with ED, and has rarely been investigated in children with psychiatric disorders. However, as one possible indicator of prevalence characteristics, a past study of children referred to mental health clinics found combined receptive-expressive impairment to be more common than receptive or expressive impairment only (Cohen, Davine, Horodezky, Lipsett, & Isaacson, 1993).

The frequent presence of language disorders in students with ED leads to other questions about types of language disorders that are pertinent to ED teachers working with students who are comorbid for both ED and language disorders. First, learning disabilities are common in students with ED (53.2%; Glassberg, Hooper, & Mattison, 1999), and general language disorders in children are often associated with learning disabilities especially in reading and written expression

(Bray, Kehle, Caterino, & Grigerick, 2008). Therefore, to what degree are learning disabilities associated with language disorders in students with ED, and if so are there specific associations between learning and language deficits? Such knowledge could alert teachers of students with ED and language disorders to further assess such students for learning disabilities which would then require simultaneous attention.

Second, while language disorders have been associated with a range of psychiatric disorders (Paul, 2007), they appear particularly common (10-54%) in students with attention deficit – hyperactivity disorder (ADHD; Barkley, 2006). The converse is also true; in a large epidemiological study of 600 children attending a community speech/language clinic, ADHD was the most common psychiatric disorder - 19% vs approximately 7% in the general population (Cantwell & Baker, 1991). What then is the association of the different types of language disorders and specific psychopathology, especially ADHD, in students with both ED and language disorders? Should the presence of specific language disorder in a student with ED alert the teacher to a particular psychiatric disorder?

Thus, the purpose of this study is to determine the distribution in students with ED of different types of language disorders using a receptive-expressive dichotomy. We hypothesize that a combined type of receptive-expressive language disorder will be the most common. The simultaneous occurrence of language disorder and learning disability will be examined, expecting such comorbidity to be common, especially disabilities in reading and written expression. The relationships between specific language disorders and particular psychopathology will also be investigated, hypothesizing ADHD as the most frequent association. We anticipate that the emergent profiles will help ED teachers better identify and plan for the needs of their students with language disorders.

Method

Participants

The participants were 152 students receiving ED services in a medium-sized urban school district in the Midwest. They have been among the subjects of earlier reports where their random selection has been described more extensively (Nelson et al., 2005). The current number represents all the students with complete data; their group characteristics have not been previously reported. Their mean age was 11.8 ± 3.5 years as they were distributed in kindergarten through 12th grade (approximately 12 students per grade). They were predominantly male (80.9%) and Caucasian (85.5%).

Measures

Student records. The school records of each participant were used to collect demographic information and IQ scores. The Wechsler Intelligence Scale for Children, Third Edition (WISC-III; Wechsler, 1991) had been employed to assess IQ for the majority of the students. The following WISC-III IQ scores were used: Verbal (VIQ), Performance (PIQ), and Full Scale (FIQ).

Academic achievement. The Broad Reading, Broad Math, Broad Written Language, and Total Achievement clusters of the Woodcock-Johnson-III (WJ-III; Woodcock, McGrew, & Mather, 2001a) were used to investigate the academic achievement of the participants. The WJ-III subtests that were administered by the data collectors 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), and (3) Broad Written Language (Spelling, Writing Fluency, and Writing Samples). Total Achievement is based on all the tests.

As another way to understand the extent of underachievement, percentages of learning disabilities were calculated. The definition of learning disability remains controversial: evidence is accruing against the scientific soundness of IQ-achievement discrepancy at the same time that use of an achievement cutoff score is suggested by the response-to-intervention approach (Kavale & Forness, 2000). Because of its practicality and previous use in the study of reading disabilities in students with ED (Mattison, 2008), learning disabilities were calculated by determining the percentages for each language group who scored < 85 in each achievement area (with the expectation of approximately 17% of a general population scoring below the cutoff).

Language. The Clinical Evaluation of Language Fundamentals, Third Edition (CELF-3) (Semel et al., 1995) was used to assess language skills and was administered by the data collectors. This report will focus on standard scores for the instrument's three composite scores: Receptive, Expressive, and Total Language. Three core subtests were administered, depending on age, to compute each composite: Receptive (Sentence Structure, Concepts and Directions, Word Classes, and Semantic Relationships) and Expressive (Word Structure, Formulated Sentences, Recalling Sentences, and Sentence Assembly). Total Language was based on the six subtests that make up the Receptive and Expressive composites.

The CELF-3, a widely used measure of language skills, has well-established psychometric properties. For example, strong test-retest stability has been found for Receptive (Pearson correlation coefficient of .86), Expressive (.88), and Total Language (.91), and discriminant

validity has been demonstrated through the 71.3% correct classification of students receiving language services (Semel et al., 1995).

Definitions of language disorders are not yet fully agreed upon and vary from clinical definitions used by DSM-IV and speech pathologists to a range of cutoff scores using different language instruments (Benner et al, 2002). Use of a discrepancy between language score and IQ is now questioned (Toppelberg & Shapiro, 2000), much like achievement vs. IQ discrepancy has fallen out of favor in the field of learning disabilities. Although typologies based on increasingly specific language deficits are being proposed (Van Weerdenberg, Verhoven, & Van Balkom, 2006), the general typology of language disorders based on receptive and expressive deficits remains common (Peterson & McGrath, 2009), especially at the time of the study.

This study used definitions based on the original instruments (CELF-3 and WISC-III IQ) used by Nelson and his colleagues (2005). They earlier defined general language disorder primarily by use of a standard score ≤85 (1 *SD*) on one of the CELF-3 composite scores: Receptive, Expressive, or Total Language. This broad categorization has now been narrowed into four types of language disorders in which Total Language is no longer used. An IQ parameter was added to the last two definitions to identify a group where language deficits might be consistent with low IQ. Which IQ score to use in any language definition remains unsettled; the VIQ and PIQ parameters below were selected to account for the real-world variation that students show.

Therefore, a participant could meet only one definition:

1. receptive only (RO) if only the broad Receptive Language score is <85 (with no IQ parameter),
2. expressive only (EO) if only the broad Expressive score is <85 (with no IQ parameter),
3. both broad Receptive and Expressive scores are <85 with VIQ and/or PIQ ≥ 85 (RE1), i.e., where low language scores are likely not related to globally low IQ scores,
4. both broad Receptive and Expressive scores are <85 with both VIQ and PIQ also < 85 (RE2), i.e., where low language scores may be related to similarly low IQ scores.

Those students who met none of the above four language disorder types were considered no language disorder (No L).

Psychopathology rated by teachers. The broad scores for the Teacher's Report Form (TRF) (Achenbach, 1991) were used to measure dimensions of behavioral and emotional problems in the participants. The TRF scoring profile provides a total score (Total Problems) as well as two broad scores (Internalizing and Externalizing). The Internalizing score is based on the scores for the narrow TRF syndromes of

Withdrawn, Somatic Complaints, and Anxious/Depressed scores, while Externalizing is based on the Delinquent Behavior and Aggressive Behavior scores. Scores for the remaining syndrome of Social Problems, Thought Problems, and Attention Problems scores are not included on either Internalizing or Externalizing scale scores. In addition to Externalizing, Internalizing, and Total Problems, the Attention Problems syndrome, which has some established relationship with ADHD (Achenbach, 1991), will also be examined because of the known association of ADHD and language disorders.

The TRF has often been used in the study of students with ED (Mattison, 2004). The psychometric properties for its scales are well-established: for example, a strong mean test-retest Pearson *r* of .92 has been found, as well as a mean teacher agreement of .54 (Achenbach, 1991). Validity has been demonstrated by the ability of its scales to significantly differentiate special students with emotional problems from students with learning disabilities, and children referred to mental health clinics from non-referred children (Achenbach, 1991).

In addition to the use of T scores, percentages of students in a clinical range will be investigated. Achenbach (1991) suggests that the clinical range be represented by T scores >63 for the broad scales and >70 for the narrow scales. Approximately 10% of the general population would score T>63 and approximately 2% T>70.

Procedure

To summarize (for more extensive description, see Nelson et al., 2005, and Benner, 2005), after initial approval by the IRB of the University of Nebraska, project staff contacted the parents/guardians of potential participants to explain the study and then, when applicable, to obtain informed consent and child assent to participate in the project. Data collectors then searched the student records for demographics and IQ, and they also administered the CELF-3 and the WJ-III. Each student's primary special education teacher completed the TRF.

The six data collectors were trained to manage the behavior of students during testing and to administer the CELF-3 and the WJ-III, using the training procedures outlined by the authors of the CELF-3 and the WJ-III. To demonstrate mastery of test administration, data collectors were observed delivering the test to a child under simulated conditions until mastery of test administration was reached. Fidelity was assessed using a modified version of the observation checklist created by the authors of the CELF-3 and WJ-III. When the data collector administered each test with 95% fidelity under simulated test conditions, they were approved to test in the schools.

Fidelity checks were then conducted prior to test administration

and on every third test administration. Fidelity was calculated by dividing total number of occurrences (e.g., following testing script) and non-occurrences (e.g., not following testing script) by the total number of occurrences for each of the items on the observation checklists for the the CELF-3 and the WJ-III. Item by item fidelity for administration of the CELF-3 ranged from 97 to 100%, and from 95 to 100% for the WJ-III. Overall fidelity was 99% and 97% for administration of the CELF-3 and WJ-III, respectively.

The CELF-3 and WJ-III were administered to each student in a quiet area of the school. Assessment was staggered over two or more days to obtain the student's best performance. Moreover, the examiner divided testing into two 15 to 20 minute sessions to improve attention to each CELF-3 and WJ-III task.

Data Analysis

Demographic and IQ scores were first compared among the five language groups, using ANOVA (with Tukey post hoc analysis) for the continuous variables (such as IQ) and multiple chi square analysis for categorical data (such as gender). Any demographic or IQ variable that emerged as significant from these initial analyses was then used as a covariate in the subsequent analyses.

ANCOVA was then used to compare the five groups on the continuous composite scores for the CELF-3, WJ-III, and TRF, while multiple chi square analysis was used to compare the groups on categorical data such as percentages. Analysis of subtest/subscale scores was not undertaken in this report. To control for Type I error, Bonferroni correction was implemented by dividing $\alpha = .05$ by four to obtain a critical significant level of .0125 (or $p \leq .01$).

Finally, Pearson correlation was used to determine any significant relationships between IQ and CELF-3 scores for the total sample.

Results

Characteristics of the Total Sample

Cognitively, the mean IQ scores for the total sample of 152 students with ED were in the average range, while their mean language scores were in the low-average range. They showed the following mean WISC-III IQ scores: VIQ 94.9 ± 16.6, PIQ 98.9 ± 17.2, and FIQ 96.7 ± 15.7. Their mean CELF-3 standard scores were: Receptive 88.6 ± 18.5, Expressive 81.4 ± 15.4, and Total Language 83.9 ± 16.2. Pearson correlations of these composite language scores with the IQ scores (VIQ, PIQ, and FIQ, respectively) for the total sample were: Receptive (.55, .54. and .63), Expressive (.51, .38, and .52), and Total Language (.58,

.51, and .63) (all p <.001 and considered strong except for .38 [Cohen, 1988]).

Academically, the total sample's mean WJ-III standard scores were generally in the average range. They were as follows, from highest to lowest: Broad Mathematics 93.6 ± 15.3, Broad Reading 91.8 ± 14.4, and Written Language 89.9 ± 17.0. The mean Total Achievement score was 89.3 ± 17.0

Finally, according to the mean TRF broad scores for the total sample, their results were most noteworthy for Externalizing psychopathology in the clinical range (T score > 63). The mean T scores for the broad groups were: Externalizing 65.2 ± 9.4, Internalizing 59.3 ± 9.0, and Total Problems 65.7 ± 8.2.

Prevalence and Basic Characteristics of Language Disorder Types in Students Classified ED

Prevalence. The majority of the participants were defined by one of the four definitions of language disorder (65.1%; n = 99), or, conversely, only 34.9% (n = 53) had no language disorder. The prevalence of the four language disorders, in descending percentages, was: (a) 27.6% (n = 42) with both CELF-3 Receptive and Expressive language scores < 85 and WISC-III VIQ and/or PIQ > 85 (RE1), (b) 23.0% (n = 35) with only Expressive < 85 (EO), (c) 7.9% (n = 12) with both Receptive and Expressive < 85 and both VIQ and PIQ < 85 (RE2), and (d) 6.6% (n = 10) with only Receptive < 85 (RO). Thus the percentages of students with a combined receptive and expressive disorder were somewhat more common than those with single-deficit disorders – 35.5% vs. 29.9%, respectively. Within the two combined groups, the language dysfunction for most students did not appear generally related to low IQ (i.e., both VIQ and PIQ < 85).

To explore prevalence changes that would occur if the language groups were defined by more conservative cutoffs that could be used by other researchers, prevalence for language disorders was also determined if the previous CELF-3 and WISC-III IQ parameters were changed to < 78 (1 ½ *SD* below the mean). The small majority of the students then showed no disorder (57.9%; n = 88), while 42.1% (n = 64) met criteria for a language disorder (a decrease of about 20% from the <85 parameters). The new descending order of percentages became: 17.1% EO, 16.4% RE1, 6.6% RO, and 2.0% RE2. Overall, this order differed little from the <85 parameters, with the main decreases in the combined RE categories. Only the groups based on the initial <85 parameters are used in this study.

Demographic and IQ differences. Demographically, the only significant difference among the five groups was a main effect for age (Table

1), with no significant differences between specific groups. Gender and race showed no significant differences among the groups.

Significant differences did emerge among the groups for all WISC-III IQ parameters (Table 1). In general, the mean IQ scores for the NoL, RO, and EO groups did not differ significantly among themselves (all close to approximately 100), but they were significantly greater than one or both of the RE groups. The RE1 group was also significantly higher than RE2 on both the PIQ and FIQ scores. Indeed, with the IQ parameters for the RE2 group defined as <85, all of its resultant mean IQ scores were < 76. Finally, no significant difference emerged among the five groups for the discrepancy between the PIQ and VIQ scores (Table 1). Mean VIQ was lower than mean PIQ in only two of the four language groups, and all mean differences were 8 or less (which is not significant according to the WISC-III manual [Wechsler, 1991]).

Because of the significant differences found for age and IQ, subsequent analyses for the CELF-3 (language), WJ-III (achievement), and TRF (psychopathology rated by teachers) were covaried with age and FIQ.

CELF-3 differences among language disorder types. First, the severity of language dysfunction among the four specific language disorder groups is striking, even taking into account the <85 parameters (Table 2). The areas of deficit in the RO and EO groups were mean scores of 78.0 and 76.0, respectively. Furthermore, in both of these single-deficit groups the differences between Receptive and Expressive mean scores were greater than 1 *SD*, and the mean discrepancies of 11.6 and 20.0 would be considered significant (≥ 12) according to CELF-4 criteria (Semel, Wiig, & Secord, 2003), which would likely be similar for CELF-3 (although not listed specifically in that manual). Finally, the mean language scores for the RE1 group ranged from 69.2 to 71.5, and from 60.2 to 66.3 for the RE2 group, i.e., all nearly or greater than 2 *SD* below the mean.

Using age and FIQ as covariates, significant differences (p <.001) among the five groups were found for all CELF-3 composite categories (Table 2). These findings were in general consistent with the parameters imposed by the definitions of the various language disorders.

Pertinent discrepancies were also investigated for CELF-3 scores. Inspection of Table 2 reveals the following. First, Receptive minus Expressive Language discrepancies were <8 and not significantly different for the two combined groups and No L, although they were generally significantly smaller than both single-deficit groups. Second, the discrepancies between IQ scores minus Total Language primarily distinguished any language disorder from No L (VIQ somewhat more

Table 1
Demographic and IQ Characteristics of Language Disorder Groups

Variable	Language Disorder Group 1 RO	2 EO	3 RE1	4 RE2	5 No L	F/χ^2	Post hoc
Student Participants (*n*)	10	35	42	12	53		
Demographics:							
Age	10.4 (3.8)	12.7 (3.1)	12.7 (3.8)	10.0 (3.4)	11.3 (3.2)	2.75*	None
Male	90.0%	82.9%	69.0%	83.3%	86.8%	5.68	
Ethnicity							
Caucasian	80.0%	85.7%	88.1%	91.7%	83.0%	1.11	
African American	20.0%	14.3%	7.1%	8.3%	9.4%		
Other	0.0%	0.0%	4.8%	0.0%	7.5%		
WISC-III IQ:							
Verbal	99.7 (16.8)	97.6 (12.5)	87.0 (11.0)	75.6 (7.0)	102.8 (18.2)	13.15**	1,2,5>4; 2,5>3
Performance	96.6 (21.8)	103.0 (14.1)	95.0 (12.0)	74.8 (8.3)	105.1 (18.0)	10.99**	1,2,3,5>4; 5>3
Full Scale	98.9 (20.2)	100.8 (12.7)	89.0 (10.8)	74.3 (6.4)	104.7 (14.1)	18.71**	1,2,3,5>4; 2,5>3
[Performance – Verbal]	-3.1 (11.7)	5.4 (11.6)	8.0 (14.0)	-0.8 (10.6)	2.3 (16.3)	2.14	

Note. The abbreviations for the language disorder groups are: Receptive only <85 (RO), Expressive only <85 (EO), both Receptive and Expressive <85 with Verbal and/or Performance IQ ≥ 85 (RE1), both Receptive and Expressive <85 with both Verbal and Performance IQ <85 (RE2), and No Language Disorder (No L). Standard deviations for mean scores are in parentheses.
* $p < .05$, ** $p < .001$

Table 2
Characteristics of the Clinical Evaluation of Language Fundamentals – 3rd Edition (CELF-3) in Language Disorder Groups

CELF-3	Language Disorder Group					*F*	Post hoc
	1 RO (n=10)	2 EO (n=35)	3 RE1 (n=42)	4 RE2 (n=12)	5 No L (n=53)		
Composite Scores:							
Receptive Language	78.0 (8.0)	95.9 (7.2)	71.5 (10.1)	66.3(13.0)	104.5 12.6)	44.87**	2,5>1,3,4; 5>2
Expressive Language	89.6 (3.1)	76.0 (8.0)	70.4 (10.1)	60.2 (9.8)	96.9 (8.4)	51.64**	1,5>2,3,4; 2,3>4
Total Language	82.6 (5.1)	84.8 (6.1)	69.2 (8.4)	61.8 (9.6)	100.3 (9.6)	62.90**	5>1,2,3,4; 1,2>3,4
Discrepancy Scores:							
[Receptive – Expressive Language]	-11.6 (7.4)	20.0 (9.6)	1.1 (12.2)	6.1 (10.8)	7.7 (11.2)	21.08**	2,3,4,5>1; 2>3,
[Verbal IQ - Total Language]	17.1 (14.5)	12.8 (12.6)	17.8 (11.0)	13.8 (9.1)	2.5 (16.6)	29.78**	1,2,3,4>5; 3,4>2
[Performance IQ - Total Language]	14.0 (19.8)	18.2 (12.8)	25.8 (13.3)	13.0 (12.1)	4.8 (15.7)	12.96**	2,3>5
[Full Scale IQ - Total Language]	16.3 (18.0)	16.0 (12.0)	19.9 (11.3)	12.5 (8.2)	4.4 (12.5)	9.67**	1,2,3>5;

Note. The abbreviations for the language disorder groups are: Receptive only <85 (RO), Expressive only <85 (EO), both Receptive and Expressive <85 with Verbal and/or Performance IQ ≥ 85 (RE1), both Receptive and Expressive <85 with both Verbal and Performance IQ <85 (RE2), and No Language Disorder (No L). Age and Full Scale IQ were covariates in these analyses (except only age was covaried for [Full Scale IQ – Total Language]). Standard deviations for the mean scores are in parentheses.
** $p < .001$

than PIQ). However, these discrepancies produced little discrimination among the language groups. The RE1 group showed the largest mean discrepancy for each IQ score.

Achievement Differences among Language Disorder Types

The mean standard scores for the four broad clusters of WJ-III achievement appeared to decrease as the extent of language deficits increased (Table 3). The standard scores for the No L group were all average (range = 100.5 to 103.4), while the scores for the single-deficit RO and EO groups were also average although at the low end of the average range (89.4 to 95.4). In contrast, all scores for the double-deficit RE groups were <85 (range = 72.4 to 84.3). With the exception of the RO group, the Written Language cluster standard score was the lowest mean score for all four specific language disorder groups. The Broad Reading score was the second lowest achievement area.

Significant differences (p <.001) were found among the five groups (Table 3) for all achievement areas of the WJ-III (again covarying for age and FIQ). However, these differences were only related to the No L group scoring significantly higher than the other groups, especially RE1. Thus, in general, the students with any language disorder showed significantly worse global achievement than the children with no language disorder.

As another way to understand the extent of underachievement, percentages of learning disabilities were calculated (Table 3) by determining the percentages for each language group who scored < 85 in each achievement area. These results paralleled the findings for the mean standard scores, with the addition of some significant differences among specific language groups. They also indicate the high occurrence of learning disabilities associated with language disorders; overall, 60.6% of those students with any language disorder also had at least one learning disability in any achievement area. This finding was especially true for the two combined groups where learning disabilities generally were greater than 50% in each area. Learning disabilities were not common in the No L group (all 11.3% or less), and ranged between 17.1% and 31.4% for the RO and EO groups. Although learning disabilities in Written Language and Reading were the most common, math was not much lower.

Finally, to conversely understand the occurrence of language disorders in the students with learning disabilities, 45.4% of the participants (n=69) scored <85 on at least one of the broad clusters (28.2% Reading, 27.0% Math, and 33.6% Written Language). Of these children defined with any learning disability, all but six students or 91.3% were also in a language disorder group, including 97.7% for Reading,

Table 3
Woodcock-Johnson-III (WJ-III) Achievement Scores for Language Disorder Groups

WJ-III Broad Clusters	Language Disorder Group					F/χ^2	Post hoc
	1 RO (n=10)	2 EO (n=35)	3 RE1 (n=42)	4 RE2 (n=12)	5 No L (n=53)		
Mean Standard Scores:							
Total Achievement	89.2 13.3)	90.0 (12.2)	77.6 (13.1)	72.4 (14.5)	102.1 (13.6)	9.95**	5>2,3,4
Broad Reading	93.2 (9.8)	91.5 (11.0)	81.8 (12.2)	78.1 (12.5)	102.6 (10.8)	11.95**	5>2,3,4
Broad Math	89.4 (20.6)	95.4 (10.7)	84.3 (10.9)	80.6 (13.8)	103.4 (13.7)	5.33**	5>1,3
Broad Written Language	91.9 (14.0)	90.3 (15.2)	80.0 (12.9)	75.5 (15.2)	100.5 (15.4)	6.07**	5>3,4
Percentages <85:							
Total Achievement	30.0%	37.1%	64.3%	83.3%	7.5%	44.14**	2,3,4>5; 3,4>2
Broad Reading	30.0%	25.7%	50.0%	58.3%	1.9%	34.30**	1,2,3,4>5; 3>2
Broad Math	20.0%	17.1%	57.1%	41.7%	7.5%	32.84**	3>1,2,5; 4>5
Broad Written Language	30.0%	31.4%	54.8%	66.7%	11.3%	26.25**	2,3,4>5; 3,4>2

Note. The abbreviations for the language disorder groups are: Receptive only <85 (RO), Expressive only <85 (EO), both Receptive and Expressive <85 with Verbal and/or Performance IQ ≥ 85 (RE1), both Receptive and Expressive <85 with both Verbal and Performance IQ <85 (RE2), and No Language Disorder (No L). Age and Full Scale IQ were covariates in these analyses. Standard deviations for the means are in parentheses.
** p <.001

90.2% Math, and 88.2% Written Language. Thus, in the total sample, it was rare for students with any learning disability to not also have a language disorder.

TRF Differences among Language Disorder Types

The TRF mean T scores for the broad groups (Table 4) demonstrate the noteworthy degree of psychopathology rated by the teachers for all four language groups as well as for No L (again covarying for age and FIQ). However, the language and non-language groups were not significantly distinguished. In general Externalizing predominated over Internalizing in all five groups, with each Externalizing mean T score in the clinical range (i.e., T > 63). Similarly, each Total Problems score was in the clinical range. RE1 showed the highest mean T scores for all three broad scales. The results for one syndrome scale, Attention Problems, are shown because of its common association with ADHD, but its mean T score showed no significant differentiation among the language groups (Table 4).

The severity of TRF psychopathology for the language groups was also studied by determining the percentages of each group that were in the clinical range with TRF cutoffs (Table 4). The majority of each group was in the clinical range for Total Problems. Externalizing percentages were generally 20% higher than Internalizing among the groups. The highest percentage in the clinical range was 77.5% for RE1and over one-third of the RE2 group was in the clinical range for Attention Problems. However, no significant difference ($p \leq .01$) was found among the groups for TRF psychopathology.

Discussion

Language disorders based on <85 parameters occurred in 65.1% of this ED sample, with combined RE disorders the most common (35.5%) and RO the least frequent (6.6%). Whereas significant CELF-3 differences among the groups were generally as definitions would have predicted, the severity of the various deficits was striking, especially for the combined groups. The children with any language disorder showed significantly poorer achievement and more learning disabilities in all areas compared to the children with no language disorder (whose IQ and achievement scores were generally average). Also, the children with combined language disorders were worse in achievement than those with single-deficits. Finally, although teacher-rated psychopathology was in the clinical range for Total Problems in a majority of each group, the four language groups were not well distinguished from each other or from the students with no language disorder.

Table 4
Teacher's Report Form (TRF) Scores for Language Disorder Groups

TRF	Language Disorder Group					F/χ^2
	1 RO (n=10)	2 EO (n=35)	3 RE1 (n=42)	4 RE2 (n=12)	5 No L (n=53)	
Mean T Scores:	60.1 (4.9)	60.1 (6.2)	64.7 (7.7)	66.0 (9.8)	61.6 (8.6)	1.67
Attention Problems	60.3 (8.0)	57.7 (9.9)	61.8 (7.9)	56.8 (7.9)	58.8 (9.4)	1.55
Internalizing Problems	64.7 (6.4)	63.2 (10.5)	68.5 (7.9)	64.6 (7.8)	64.4 (10.2)	2.13
Externalizing Problems	65.0 (6.0)	64.1 (8.7)	68.3 (7.5)	65.3 (8.2)	65.0 (8.6)	1.78
Total Problems						
Percent in Clinical Range:						
Attention Problems (T>70)	0.0%	2.9%	14.6%	36.4%	15.4%	9.61
Internalizing Problems (T>63)	50.0%	28.6%	37.5%	27.3%	26.9%	3.44
Externalizing Problems (T>63)	50.0%	48.6%	77.5%	45.5%	55.8%	10.19
Total Problems (T>63)	70.0%	54.3%	68.3%	63.6%	57.7%	2.42

Note. The abbreviations for the language disorder groups are: Receptive only <85 (RO), Expressive only <85 (EO), both Receptive and Expressive <85 with Verbal and/or Performance IQ ≥ 85 (RE1), both Receptive and Expressive <85 with both Verbal and Performance IQ <85 (RE2), and No Language Disorder (No L). Age and Full Scale IQ were covariates in these analyses. Standard deviations for mean scores are in parentheses. No significant differences ($p \leq .01$) were found.

The value of categorization into different types of language disorders is probably best indicated by single-deficit vs. combined types. Although not always significantly so, the breadth and depth of dysfunction was more noteworthy in the combined groups than in the single-deficit groups. For example, the RE1 group was characterized by mean CELF-3 scores of 69.2 to 71.5, learning disability rates of 50.0% to 54.8%, and a clinical rate for Externalizing problems of 77.5%. The IQ, language, and learning functioning for the RE2 group were even worse. Thus, the intervention planning that will be necessary for the combined groups will differ considerably from the single-deficit groups.

The overall prevalence rate in this study of 65.1% (with expressive type greater than receptive type) is consistent with findings in a recent major literature review of language deficits and psychiatric disorders by Benner and his colleagues (2002). Averages of 71% for any language deficit, 64% expressive, and 56% receptive were found in 18 studies in which a variety of language instruments and definitions for language deficit were used in children who met either a special education or a DSM definition of emotional or behavioral disorder. Although percentages for receptive-expressive combinations were not given, the averages would indicate that combined language disorders were common.

The distribution in this study also appears similar to the findings for specific language disorders in a large epidemiological study of children attending a community speech/language clinic (Cantwell & Baker, 1991), i.e., a non-psychiatric population. While definitions are somewhat different and numbers of cases are given rather than percentages, the number of expressive language disorders is greater than receptive cases, and overlap (i.e., combinations) appears common. Furthermore, in another pertinent comparison with language-impaired children, the CELF-3 mean scores for Total Language in the current four language disorder groups (ranging from 61.8 to 84.8) appear consistent with scores found for 136 children with language disorders diagnosed by speech pathologists (Semel et al., 1995). Their mean CELF-3 Total Language score was 78.6.

Our findings for language disorders in students with psychiatric disorders who are also classified ED can probably be best compared with a series of studies by Cohen and her colleagues who investigated language impairment (both previously identified and newly identified) in children referred to mental health clinics. Their methodology shared some of our instruments (including an earlier version of the CELF as part of a language battery). To summarize the similar results of the current and the Cohen studies, both sets of work found chil-

dren with comorbid psychiatric disorders and language impairment to have more combined language deficits, increased global learning underachievement, and increased psychopathology. Specifically, combined receptive/expressive impairment was most common (46.4% vs. 42.4%, in referred children with identified and unidentified language deficits, respectively) followed by receptive only (31.8% vs. 38.3%) and expressive only (11.8% vs. 19.2%) (Cohen, Davine, Horodezky, Lipsett, & Isaacson, 1993). Academically, the referred children with language impairment scored significantly lower than the referred children with no language impairment on achievement tests (reading, math, and spelling) and on the abbreviated verbal, performance, and full scale IQ scores of the WISC-III (Cohen et al., 1998).

In addition to the finding of high rates of learning disabilities in the students with language disorders, the converse finding was perhaps surprising - most children who showed any learning disability also had a language disorder. Some comment can be made concerning reading disabilities. Students classified ED who also have a reading disability have shown some association with language dysfunction (Mattison, 2008). Together with the current findings, the implication may be that students with ED and reading disorders are more likely to have language-based reading disorders rather than dyslexia due to disrupted phonological processing. However, the overall increased association of learning disabilities with language disorders in students classified ED must clearly be replicated and further explored, especially because of the common occurrence of learning disabilities in students with ED (Glassberg et al., 1999).

The TRF results in the present study showed limited differences in severity or type of psychopathology among all five groups; indeed the No L group showed overall average functioning except for its noteworthy TRF scores. Thereby, psychopathology did not prove useful in distinguishing the different groups, although general Externalizing problems and Attention Problems indicated some promise worth further investigation. Externalizing symptoms predominated across groups, which is common for students classified ED (Mattison, 2004). These results are similar to Cohen's work which also found few differences in psychopathology between psychiatrically referred children with and without language impairment. Teachers rated both groups of language impaired children higher on the Externalizing scale than the Internalizing scale with an earlier version of the TRF (Cohen, Menna, Barwick, Im, & Horodezky, 1998).

Limitations

This sample of students with ED along with the design of the study has proven a watershed for the ED field's increased understand-

ing of language disorders in such students. However, replication with a newer generation of methodology is now necessary; for example, while the CELF-3, WISC-III, and TRF were current at the time of the study, newer versions have been introduced in the interim. Simultaneous comparison with a group of students classified as language impaired would also be revealing (as well as the addition of a third group of students classified learning disabled). Also, given the long-term risk of persistent language and academic dysfunction in children with language disorders (Peterson & McGrath, 2009), the course of students with both ED and language disorders still must be investigated, especially for prognostic factors.

With increasing understanding of the complexity of language, the assessment of language skills has advanced since the appearance of the CELF-3 and should be reflected in future language research in students with ED. For example, the more recent CELF-4 (Semel et al., 2003) now includes new indices in addition to Receptive and Expressive Language (Language Context, Language Memory, and Working Memory) as well as a Pragmatics Profile, which, of course, were not accomplished in the current study. Instruments that assess a wider range of language skills are also now available, both as single measures such as the Comprehensive Assessment of Speech and Language (CASL; Carrow-Woolfolk, 1999) or as batteries that vary according to different speech pathologists, whether they are clinicians or researchers. To accompany language testing, the measurement of other potentially related neuropsychological skills (such as working memory and processing speed) has also now been suggested. As evidence of the need for such combined testing, neuropsychological evaluation using the NEPSY has found primary deficits in the domains of language and attention/executive function in grade school students classified ED (Mattison, Hooper, & Carlson, 2006), with a specific association between language deficits and reading underachievement in such children.

The definitions of language disorders with the CELF-3 used in this report began to establish the occurrence of broad groups of students with ED who showed different profiles of serious language deficits and consequently different needs of language and other services. However, the RO and RE2 groups showed small numbers, 10 and 12, respectively, and thus require further research to establish their independent value as specific types. The RE2 group appeared to show more significant differences from the other groups. If the same four language groups are used, more stringent definitions with a larger sample of participants could also be explored. For example, lowering the standard score cut point to 80 or 78 would better identify those

students with moderate or severe language dysfunction (Semel et al., 1995), although possibly excluding many students who could respond well to language interventions while including more students who might be less responsive. The requirement for a receptive-expressive discrepancy of at least 12 points ($p<.05$) could also better isolate single-deficit subgroups. Most likely, the next research step in the investigation of different language disorders in students classified ED will need to include more than the receptive and expressive categories used in the current study (e.g., pragmatics and auditory processing), to reflect the evolving typology of language disorders in children and adolescents (Van Weerdenburg et al., 2006).

Finally, potential distinguishing history must be expanded to better understand further uniqueness for each language group that might better serve identification and intervention planning. Neurological risk factors might be useful, such as substance abuse during pregnancy or other serious complications of pregnancy or delivery. Family risk variables may prove helpful, e.g., family history of language disorders, parental education, and abuse experience. Also, history of poor language development as well as occurrence and duration of early language services might be revealing.

Implications

The findings of a range of language disorders in students classified ED, with associated increased rates of learning disabilities and clinical levels of psychopathology, have several implications for ED educators. The range of different types of language disorders indicates the need for different language interventions, not only by school speech pathologists but also by ED teachers and associated staff. The evidence base for efficacious specific language interventions depending on the deficit profile is modest but growing, with long-term effectiveness more questionable especially in relation to more serious language disorders (Paul, 2007; Peterson & McGrath, 2009). The impact of language interventions on students who are also classified ED is much less known. Studies have also not yet focused on the outcome of collaborative language intervention efforts by speech pathologists and ED teachers, as it is likely that such targeted teamwork will have more positive impact than speech pathologists working alone with such comorbid students during infrequent sessions over a school week.

More basically, the knowledge base of ED teachers for the identification and understanding of language disorders in their students as well as intervention strategies is not clear (Nelson et al, 2005) - what should the level of preparedness be for ED teachers? Three important elements for effective language instruction should prove helpful.

First, effective instruction principles for students with ED (Lloyd, Forness, & Kavale, 1998) can be incorporated, such as teacher-directed instruction, frequent low-level questions, teacher feedback, simple instruction material, and purposeful lessons. The second element is the integral involvement of speech pathologists in the planning and delivery of language interventions. The final element is preventive language intervention, such as the *Language Arts (LA)* strand of the *Reading Mastery (RM) Signature 2008* series program (SRA/McGraw-Hill, 2008). This strand teaches the syntactic, semantic, and pragmatic skills that are necessary to understand what is said, read, and written in the classroom, and can supplement any comprehensive reading and language arts program.

The overall increased percentage as well as the varying types of language disorders indicate that accompanying language disorders must be carefully ruled out in students at their initial evaluation for ED classification. The role of the testing psychologist is crucial, preceding any involvement of a speech pathologist. Practical red flags could include earlier speech/language services, underachievement in reading and/or written language skills, past or present parental and/or teacher concerns about language development, the presence of ADHD, neurological risk factors, student complaints of language difficulties, and/or evidence of language dysfunction during the initial psychological testing and interview. As for the usual battery of IQ and achievement testing, according to the results in this study, WISC-III IQ scores would not have been helpful but WJ-III achievement scores could have aided. Newer comprehensive tests of cognitive abilities (such as the Woodcock-Johnson III Tests of Cognitive Abilities; Woodcock, McGrew, & Mather, 2001b) might better uncover language deficits, while abbreviated IQ tests will likely prove inadequate. Sufficiently accurate screens for language dysfunction that can be administered by school psychologists are still to be developed for elementary and secondary students. Thus, at this point, it appears that school psychologists must primarily depend on heightened suspicion for language disorders in ED students, followed by key historical variables and discerning clinical interviews, which then lead to referral to speech pathologists for confirmatory assessment and specific planning.

The underachievement and learning disability findings of this study have two important implications. First, specific interventions for learning disabilities will also often be necessary to sufficiently educate students with both ED and language disorders. Thus academic intervention plans for many such comorbid students will become more complicated and difficult to coordinate. Special education agencies with large ED populations will have to insure the continuing

education of their ED teachers on the development and implementation of such complex treatment plans based on best-evidence interventions. Another approach would be to develop an ED staff person with special expertise in language and learning disorders who can then assist his/her colleagues with proper intervention planning. Second, the results indicate that the great majority of the participants who were defined with a learning disability also had a language disorder. Thus, ED teachers must be highly suspicious of language disorders in their students who have learning disabilities, and closely observe whether such students show disrupted language skills and any of the practical red flags described above for assessment by school psychologists.

Finally, the addition of serious psychopathology further complicates the education of students with both ED and language disorders. First, their behavioral and emotional symptoms are usually treated with psychological interventions that depend on adequate language skills: behavioral modification programs for which they must understand the verbal explanations, group counseling/discussion to learn better social interaction and problem-solving skills, and individual counseling that depends on verbal exchanges with counselors/therapists in school and/or in the community. What adaptations are required for these students to more benefit from such standard additional therapeutic interventions that depend so much on conversing? Second, their frequently guarded prognosis must be appreciated because of their mix of serious language, achievement, and psychological dysfunction. We must better understand what earlier interventions (language and otherwise) can prevent or reduce the development of their precarious states in school. We also need to identify what interventions would most benefit them as they progress through their educational careers, from more intensive and complete services to alternative programming (such as vocational training and learning more visual approaches to acquire knowledge). Lastly, how can we best help students with such comorbid disorders as well as their families optimally understand and adapt to their language deficits?

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