Internalizing and Externalizing Behaviors of Children with Writing Disabilities

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Students with specific learning disabilities (SLDs) are more likely to exhibit internalizing and externalizing behaviors than typically developing peers. Virtually none of the literature, however, reports on the behaviors of students at-risk for writing disabilities (AR-WD). We compared the behaviors of writers who are AR-WD and typically developing writers (TDW) from first through fourth grade ($N = 138$). We found that students who are AR-WD were only significantly different from TDW on Externalizing and Total Behaviors at Grade 2. These findings illustrate the benefits of studying behavior across different forms of SLD, as it appears that students ARWD do not consistently manifest significant behaviors, although interventions that simultaneously target writing and behavior may be warranted and mutually beneficial.

Writing is a necessary skill in the lives of modern citizens, one that enables us to communicate across time and space. It permits the transmission of ideas, such as those necessary for political, religious, or scientific advances, and facilitates personal expression through creative storytelling, poetry, and other forms of expressive writing (National Commission on Writing for America's Families Schools and Colleges, 2004). Currently, however, many individuals struggle with writing and are not able to participate fully in the transmission of ideas and personal expression via this output mechanism. Up to 14.7 percent of the general population may suffer from a Specific Learning Disability with an impairment in writing (SLD-W: American Psychiatric Association, 2013; Katusic, Colligan, Weaver, & Barbaresi, 2009). SLD-W is defined as a significant impairment in written composition where an individual's ability falls substantially below the expected range (Kamhi & Catts, 2012; Tunmer & Chapman, 2012).

In addition to struggles with writing, it is suspected that children with SLD-W can manifest other co-occurring disorders including those characterized by internalizing and externalizing behaviors (Cortiella & Horowitz, 2014). Depression, anxiety, inattentive, and hyperactive-impulsive types of attention-deficit/hyperactivity disorder, and somatoform disorders—that is, those that manifest as physical symptoms—are all categories from the Diagnostic and Statistical Manual of Mental Disorders, 5th edition, that are consistent with internalizing and externalizing behaviors (DSM-5: Achenbach & Rescorla, 2001; American Psychiatric Association, 2013). While there are few studies to date investigating the relation between SLD-W and behavior, researchers have

examined the relation between students' social behavior, including both internalizing and externalizing behaviors, and the presence of SLDs across impairments (Capozzi et al., 2008; Diakakis et al., 2008), and have revealed that struggling with learning has the potential to affect and co-occur with problem behaviors in a significant manner. Virtually none of the SLD literature reports on the behaviors of students with SLD-W. For instance, McIntosh, Reinke, Kelm, and Sadler (2013) and Rivera, Al-Otaiba, and Koorland (2006) report on the relationship between reading, but not writing, and associated behavioral manifestations in elementary school. As such, the field is left to presume that behaviors manifest across SLD impairments in equivalent ways.

Specific Learning Disabilities and Social-Behavioral Difficulties

SLDs are commonly associated with social-behavioral difficulties such as externalizing (e.g., high activity, impulsivity, aggression, defiance) or internalizing (e.g., depression, social withdrawal, anxiety, extreme inhibition) behaviors (Cortiella & Horowitz, 2014; Howie, Pastor, & Lukacs, 2014), and can include specific disorders (e.g., attention-deficit/hyperactivity disorder, oppositional defiant disorder, conduct disorder, anxiety disorder) that differentiate affected students from their peers (Bunte, Schoemaker, Hessen, van der Heijden, & Matthys, 2013; Gunther, Jolles, Herpertz-Dahlmann, & Konrad, 2009). Thus, children with SLDs are more likely to have social and behavioral difficulties than their typically developing (TD) peers. In general, between 24 and 52 percent of children with SLDs have been reported to have co-occurring social-behavioral difficulties (Capozzi et al., 2008; Diakakis et al., 2008). Specifically, children with SLDs are rated by teachers and parents as having more

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aggressive, disruptive, hyperactive, and inattentive behaviors than TD individuals (Ebejer et al., 2010; Garwood, Varghese, & Vernon-Feagans, 2017; Miller et al., 2014), signifying that a significantly higher proportion of students with SLDs display oppositional and aggressive behaviors when compared to their TD peers (McDermott, Goldberg, Watkins, Stanley, & Glutting, 2006). Students with SLD also self-report increased internalizing and externalizing behaviors than TD students (Arnold et al., 2005; Morgan, Farkas, & Wu, 2012; Nelson & Harwood, 2011). Notably, each of the above-named studies looked at SLDs across impairment without examining how SLD-reading, writing, or math might differentially relate to behavior. More recently, Sainio, Eklund, Ahonen, and Kiuru (2019) reported a significant relation between academic emotions and reading and math disabilities in sixth grade students. Here, students with reading disabilities showed lower levels of hope and higher anxiety toward reading than those without reading disabilities, while students with math disabilities showed lower enjoyment, lower hope, and higher levels of anxiety than students without math disabilities. Students with writing disabilities were not included in that study.

Writing Disabilities and Social-behavioral Difficulties

Despite the abundance of studies examining various facets of social-behavioral difficulties in children with SLDs, only one study has examined social-behavioral difficulties in children with a SLD-W. Alevriadou and Giaouri (2016) showed that fifth-grade students identified with a SLD-W exhibited attention deficits, difficulties with organization and planning, self-regulation problems, and low self-esteem. Further, a statistically significant correlation existed between these behaviors and academic abilities. The sample was restricted to students with a SLD-W, however, so it remains unclear how students with a SLD-W compared to students who are typically developing writer (TDW). Of greater importance to the current investigation, no existing studies could be found that examined the relations between behavior and writing in a sample of students who are at-risk for writing disabilities (AR-WD), but are not formally diagnosed with SLD-W. We believe that the existing literature on the relations between SLD and behavior likely generalizes to an at-risk population, given that a defining characteristic of both SLD-W and AR-WD is consistent underachievement in writing in contrast to TDW. The current study will address these gaps in the learning-disability literature.

Purpose

Given the lack of focus on the relationship between social-behavioral difficulties and being diagnosed with either SLD-W or AR-WD in previous research, this study represents one of the first attempts to examine how the behavior of children who struggle with writing differs from that of children who are TDW. To address this gap in the literature, we used a cross-sectional study design to examine the internalizing and externalizing behaviors of children who are AR-WD versus a comparison group of children who are TDW via behavioral ratings obtained from classroom teachers in grades 1 through 4. We recognize that the field has not yet come to consensus on how to identify risk, and that multiple means exist to do so (Coker & Kim, 2018). Within our sample, we have termed students as AR-WD based on cut scores on a theoretically grounded assessment, as is increasingly common (Barnes et al., 2019; Costa, Hooper, McBee, Anderson, & Yerby, 2012; Ray, Graham, & Liu, 2019). One reason we have chosen not to label these students as SLD-W is evidence that such classification should not occur on the basis of measurement at a single time point, but instead should examine both low achievement and response to instruction (Fletcher, Denton, & Francis, 2005). Given that we have no data on response to instruction, we feel classification as SLD-W would be inappropriate.

Within this study, we address the question, "How do the internalizing and externalizing behaviors of children at risk for writing difficulties differ from those of typically developing writers?" Based on the available research in SLDs, it is suspected that children who are AR-WD will present more social-behavioral difficulties, as indicated by the presence of elevated internalizing and externalizing behaviors, than peers who are TDW. Further, it is suspected that there will be a higher proportion of children who are AR-WD and who will show significant levels (i.e., at least one standard deviation above the mean) of social-behavioral difficulties on the teacher rating scale than their peers who are TDW.

METHODS

The current study is a secondary data analysis of a larger study designed to assess the effectiveness of an intervention on written language for young elementary students at-risk for having difficulties with writing (Hooper et al., 2013). Only students contained within the nontreatment comparison groups were included in the current study to avoid confounding the results with the effects of the intervention. Additionally, while the larger study was longitudinal in nature, this study used a cross-sectional design, given that not all variables of interest were available for all students at each time point. The cross-sectional design provides indications of group differences across the different grades sampled.

Participants

Students ($N = 296$) were recruited at the beginning of their first-grade year from seven public K-5 elementary schools across a large metropolitan area of the southeastern United States. Two cohorts of students were ascertained across two consecutive years. Students were sent home with a packet that included an informational flyer, a letter to parents about the study, and a consent form. Students had to have both a Wechsler Individual Achievement Test, 2nd Edition (WIAT-II) and a Child Behavior Checklist–Teacher Report Form (CBCL–TRF) to be included in the analyses. Thus, the sample included 35 children at Grade 1, 92 at Grade 2, 69 at

TABLE 1
Demographics for the At-Risk for a Writing Disability (AR-WD) and Typically Developing Writers (TDW) Groups

| | Grade 1 | | Grade 2 | | Grade 3 | | Grade 4 | |
| | AR-WD | TDW | AR-WD | TDW | AR-WD | TDW | AR-WD | TDW |
Characteristic	(n = 13)	(n = 22)	(n = 37)	(n = 55)	(n = 26)	(n = 43)	(n = 24)	(n = 77)
Sex (percent)								
Male	46.2 (6)	36.4 (8)	67.6 (25)	52.7 (29)	65.4 (17)	51.2 (22)	79.2 (19)	48.1 (37)
Female	53.8 (7)	63.6 (14)	32.4 (12)	47.3 (26)	34.6 (9)	48.8 (21)	20.8 (5)	51.9 (40)
Race (percent)								
Caucasian	84.6 (11)	72.7 (16)	67.6 (25)	81.8 (45)	76.9 (20)	76.7 (33)	79.2 (19)	79.2 (61)
Black or African American	7.1 (1)	22.7 (5)	27.0 (10)	10.9 (6)	23.1 (6)	16.3 (7)	20.8 (5)	14.3 (11)
Asian American	0.0 (0)	0.0 (0)	0.0 (0)	1.8 (1)	0.0 (0)	2.3 (1)	0.0 (0)	1.3 (1)
Native American	0.0 (0)	0.0 (0)	2.7 (1)	1.8 (1)	0.0 (0)	2.3 (1)	0.0 (0)	1.3 (1)
Multiracial	7.7 (1)	4.5 (1)	2.7 (1)	3.6 (2)	0.0 (0)	2.3 (1)	0.0 (0)	3.9 (3)
Hispanic (percent)	7.7 (1)	4.5 (1)	10.8 (4)	12.7 (7)	19.2 (5)	7.0 (3)	20.8 (5)	6.5 (5)
Maternal education (percent)								
Grades 1–8	0.0 (0)	0.0 (0)	0.0 (0)	6.0 (3)	4.5 (1)	2.6 (1)	0.0 (0)	2.9 (2)
Grades 9–12 (no diploma)	16.7 (2)	5.6 (1)	5.9 (2)	0.0 (0)	13.6 (3)	0.0 (0)	9.5 (2)	2.9 (2)
HS Graduate/GED	8.3 (1)	16.7 (3)	14.7 (5)	12.0 (6)	18.2 (4)	7.7 (3)	28.6 (6)	13.0 (9)
HS Graduate + technical training	0.0 (0)	0.0 (0)	11.8 (4)	10.0 (5)	13.6 (3)	5.1 (2)	9.5 (2)	4.3 (3)
HS Graduate + College (no degree)	8.3 (1)	27.8 (5)	14.7 (5)	12.0 (6)	4.5 (1)	7.7 (3)	0.0 (0)	14.5 (10)
AA/AS Degree	8.3 (1)	11.1 (2)	8.8 (3)	12.0 (6)	9.1 (2)	15.4 (6)	9.5 (2)	14.5 (10)
BA/BS Degree	50.0 (6)	22.2 (4)	35.3 (12)	34.0 (17)	31.8 (7)	48.7 (19)	38.1 (8)	37.7 (26)
MA/MS Degree	8.3 (1)	16.7 (3)	8.8 (3)	14.0 (7)	4.5 (1)	10.3 (4)	4.8 (1)	8.7 (6)
Doctorate/professional degree	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	2.6 (1)	0.0 (0)	1.4 (1)
Mean age in months (SD)	80.2 (4.0)	78.8 (4.9)	94.5 (6.5)	94.1 (5.2)	107.9 (6.1)	103.7 (4.6)	119.4 (6.3)	117.2 (5.0)

Note. Students assigned to AR-WD scored at or below 90 on WIAT-III Written Expression; number in parenthesis represents frequency count unless otherwise noted.

Grade 3, and 100 at Grade 4. In the first year of the study, when only first grade was being assessed, the CBCL–TRF was not received from teachers for all students, as another rating scale was used and then discontinued at the request of the school system. Therefore, the sample size of first-grade students is fewer than that for other grades. In addition, the percentage of students with a diagnosed disability (i.e., SLD, SLI, ASD, OHI, ID, SLO), as evident from their individual education plan (IEPs), is 8.6 percent at Grade 1, 15.2 percent at Grade 2, 17.4 percent at Grade 3, and 14.9 percent at Grade 4. The percentage of students presenting with attention deficit hyperactivity disorder (ADHD) as reported by parents is as follows: 5.7 percent at Grade 1, 7.6 percent at Grade 2, 11.6 percent at Grade 3, and 9.9 percent at Grade 4. At the time of data collection, the IQ discrepancy method was commonly used across the school district for identifying SLD students (North Carolina Department of Public Instruction, 2015). The student demographic information for the AR-WD and TDW groups across each of the grades can be seen in Table 1.

Measures

Each measure was administered according to the manual specifications, and all reliability estimates are included below. Measures administered by researchers were scored twice, and any differences were addressed for consensus, with a third-person arbiter in the event that consensus could not be reached.

Wechsler Individual Achievement Test-Second Edition (WIAT-II)—Written Expression Subtest

The WIAT-II (Wechsler, 2005) Written Expression subtest was used to place students into the AR-WD or TDW group. The tasks included in this subtest vary at each grade level. In first and second grade, it measures students' alphabet writing, written word fluency, and sentence combining skills. Timed alphabet writing requires students to write as many letters of the alphabet as they can in 1 minute. Written word fluency requires students to write words dictated to them. Sentence combining asks students to combine two sentences into one more sophisticated sentence. In third and fourth grades, writing composition is added to the subtest. Writing composition requires students to plan and write a paragraph about a specific writing prompt within 10 minutes. Reported interitem reliability for items contributing to the written expression subtest score is high ($r = .91$; Wechsler, 2005). A low-achievement definition of at-risk status was employed (i.e., bottom quartile; Fletcher et al., 2005);

consequently, children who had an age-based standard score ≤90 were identified as AR-WD; otherwise, they were identified as TDW. Students were reclassified into groups at the beginning of each grade based on their annual achievement testing scores; thus, some students may have been reclassified as AR-WD or TDW across the various grades. This reclassification procedure is consistent with a cross-section examination at each grade level. Further, this cross-sectional design allowed us to address potential group differences at each time point.

Child Behavior Checklist–Teacher Report Form (CBCL–TRF)

The CBCL–TRF (Achenbach & Ruffle, 2000) is a questionnaire given to teachers to assess the presence of students' internalizing and externalizing behaviors at school. The questionnaire consists of 113 items using a 0 (Not True), 1 (Sometimes True), 2 (Often True) Likert scale. The CBCL–TRF yields three summary measures (internalizing problems, externalizing problems, total problems) via eight clinical scales (anxious/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behavior, aggressive behavior, withdrawn/depressed). As per the instructions, teachers were asked to consider the previous 2 months when reporting each child's behavior. They had a period of approximately 2 weeks to complete the CBCL–TRF. The CBCL–TRF has moderate to strong reliability ($\alpha = .71$ to .89 across scales). It also has strong construct and criterion-related validity (Nakamura, Ebesutani, Bernstein, & Chorpita, 2009). All scores on the CBCL–TRF are recorded as *T-scores*, with higher scores reflecting more social-behavioral concerns.

Covariates

For the analyses, we included sex given at birth, age, race, ethnicity (Hispanic or non-Hispanic), presence of an IEP, parent-reported ADHD, maternal education level, and reading level.

WIAT-II Word Reading subtest

Reading level was assessed using the WIAT-II (Wechsler, 2005) Word Reading subtest. In this subtest, students are asked to read a series of letters in a row aloud. The researcher scores for time, per row and total, and for correct naming of graphemes. Age-based standard scores were used. Internal consistency ranged from .80 to .98.

Data Analyses

Preliminary data analyses included examinations for tests of assumptions and group comparisons on sex, age, race, ethnicity, IEP status, ADHD status, maternal education level, and reading ability using the chi-square statistic (χ^2), the

independent *t*-test, and Fisher's exact test where appropriate at each grade level. Any variables that revealed group differences were used as covariates in subsequent analyses.

To address the presence of differences in internalizing behaviors, externalizing behaviors, and total behavior problems between the groups at each grade level, multivariate analysis of covariance (MANCOVA) was conducted. MANCOVA was used when students across groups were statistically different on any covariate. All assumptions regarding the use of MANCOVA were met (Tabachnick & Fidell, 2007). Box's M test was nonsignificant across all analyses, indicating that the assumption of multivariate homogeneity among covariance matrices was satisfied. We conducted the Benjamini–Hochberg (B–H) correction to account for multiple comparisons or multiplicity, and to control the false discovery rate (FDR: Benjamini & Hochberg, 1995; Thissen, Steinberg, & Kuang, 2002). The highest critical *p*-values were included when the B–H correction was used. If a significant group difference was found from the results of the MANCOVA, follow-up univariate procedures were conducted to identify which summary scale accounted for the difference, and partial eta squared was calculated to determine the magnitude of the effect, using the guidelines of Lipsey et al. (2012).

Next, the percent of students who fall at least one standard deviation above the mean was examined for the CBCL–TRF summary scales. This analysis was conducted to examine the percentage of students at each grade who could be considered at-risk for social-behavioral difficulties. A normal distribution would indicate that no more than 16 percent of students should fall above one standard deviation, so that percentage was used for comparisons.

Finally, exploratory analyses using MANCOVA were conducted to examine differences on the clinical scales of the CBCL–TRF at each grade level. Similar procedures to the main analyses were followed; at grade 2, however, Pillai's Trace correction was used, given its power and robustness when the assumption of homogeneity among covariance matrices is violated (Pillai & Sudjana, 1975).

RESULTS

The aim of this study was to examine how the internalizing and externalizing behavior of children who are AR-WD differs from individuals who are TDW. Given the cross-sectional design of the study, results for each grade level are reported separately. At each grade level, examination of the control variables is presented first, followed by examination of group differences on the CBCL–TRF summary scales (i.e., internalizing, externalizing, total behavior problems), examination of the percentage of students by group falling above one standard deviation on each of the summary scales based on normative values on the CBCL–TRF, and, finally, an exploratory examination of the CBCL–TRF clinical scales. Means, standard deviations, and group comparisons at each grade level for the CBCL–TRF are presented in Table 2. Post-hoc power analysis revealed that there was sufficient amount of observed power (88 percent) to detect a meaningful difference at grade 2 (Grunkemeier & Jin, 2007; Suresh & Chandrashekara, 2012). At all other grade

TABLE 2
Means, Standard Deviations, and Group Comparisons for Groups and Outcome Variables in Grades 1 through 4

Outcome	Grade	At-Risk for Writing Disability			Typically Developing Writers			F-Value	η_p^2
		n	M	SD	n	M	SD		
CBCL TRF—Internalize	1	13	43.9	7.4	22	45.0	8.3	–	–
	2	37	51.1	11.3	55	45.7	10.2	3.07	.03
	3	26	50.0	11.0	43	48.5	8.1	–	–
	4	24	47.4	10.7	76	44.3	9.0	–	–
CBCL TRF—Externalize	1	13	46.3	7.1	22	52.7	8.3	–	–
	2	37	56.3	10.2	55	48.2	9.0	9.14	.09
	3	26	51.5	11.4	43	49.3	9.6	–	–
	4	24	54.2	10.7	76	48.4	8.9	–	–
CBCL TRF— Total Problems	1	13	46.2	7.1	22	50.2	9.5	–	–
	2	37	56.5	10.8	55	45.2	11.5	12.60	.12
	3	26	53.5	9.6	43	48.2	9.9	–	–
	4	24	54.5	10.9	76	44.9	10.5	–	–

Note. CBCL–TRF = Child Behavior Checklist–Teacher Report Form.

levels, it was revealed that the analyses may have been underpowered due to sample size: Grade 1 Power $(1-\beta) = .46$, Grade 3 Power $(1-\beta) = .22$, and Grade 4 Power $(1-\beta) = .50$. We will address this concern in the discussion section.

Grade 1

Covariates

Preliminary results indicated that in Grade 1, the groups significantly differed only on reading ability (reading ability, $t(31) = 3.11$, $p < .01$): sex, $\chi^2(1) = .33$, $p = .57$; race, $\chi^2(2) = 1.40$, $p = .50$; ethnicity, $\chi^2(1) = .15$, $p = .70$; maternal education, $\chi^2(5) = 4.72$, $p = .45$; IEP status, $\chi 2(1) = 1.23$, $p = .27$; ADHD status, $\chi 2(1) = .15$, $p = .69$; and age, $t(31) = -.83$, $p = .42$. Therefore, all first grade MANCOVAs included reading ability as a covariate.

Main Effects

No significant main effects (i.e., group differences) on the CBCL–TRF summary scales, $F(3, 30) = 1.98$, $p = .14$, were identified. Therefore, follow-up univariate procedures were not conducted.

Percentage Falling Above One Standard Deviation

More students in the TDW group, than in the AR-WD group, received ratings that were above one standard deviation for Internalizing Behaviors (AR-WD = 7.7 percent; TDW = 18.2 percent), Externalizing Behaviors (AR-WD = 15.4 percent; TDW = 31.8 percent), and Total Behavior Problems (AR-WD = 0.0 percent; TDW = 31.8 percent). For each summary scale, the percentages of TDW students were higher than normal expectations (16 percent).

Exploratory Examination of the CBCL—TRF Clinical Scales

For the individual clinical scales, the MANCOVA did not reveal a significant main effect for the group variable, $F(8, 25) = .94$, $p = .50$. Follow-up procedures were not conducted due to the non-significant result.

Grade 2

Covariates

Preliminary results indicated that the groups significantly differed only on reading ability (reading ability, $t(90) = 4.88$, $p < .01$): sex, $\chi^2(1) = 2.00$, $p = .16$; race, $\chi^2(4) = 4.71$, $p = .32$; ethnicity, $\chi^2(1) = .08$, $p = .78$; maternal education, $\chi^2(7) = 5.92$, $p = .55$; IEP status, $\chi 2(1) = .14$, $p = .71$; ADHD status, $\chi 2(1) = 3.07$, $p = .08$; and age, $t(90) = -.33$, $p = .74$). Therefore, all subsequent MANCOVAs were conducted with reading ability as a covariate.

Main Effects

Inspection of the difference between groups in second grade on the CBCL–TRF summary scales revealed a significant main effect, $F(3, 87) = 4.62$, $p < .01$. Follow-up univariate procedures using the B–H correction showed significant group differences on two of the three summary scales, with small to large effect sizes: Internalizing, $F(1, 90) = 3.07$, $p = .08$, $\eta_p^2 = .03$; Externalizing, $F(1, 90) = 9.14$, $p < .01$, $\eta_p^2 = .09$; and total problems $F(1, 90) = 12.60$, $p < .01$, $\eta_p^2 = .12$. These findings are statistically significant ($\alpha = .05$) after correcting for multiple comparisons (highest critical p-value = .08). Children who were AR-WD received higher ratings on the externalizing and total problems summary scales, indicative of increased behavior concerns, than children who were TDW.

TABLE 3
Means, Standard Deviations, and Group Comparisons on
TRF–Clinical Scales in Grade 2

| TRF–Clinical Scales | Mean (SD) | | F-value | η_p^2 |
	AR-WD	TDW		
Anxious/depressed	54.08 (5.66)	52.85 (5.92)	.36	.004
Withdrawn/depressed	56.54 (10.51)	52.96 (6.01)	3.51	.04
Somatic complaints	52.95 (6.47)	51.05 (4.08)	1.94	.02
Social problems	56.14 (8.05)	52.49 (5.33)	5.09*	.05
Thought problems	57.27 (7.79)	52.60 (5.83)	10.41**	.11
Attention problems	59.35 (11.28)	52.87 (6.01)	6.17**	.07
Rule-breaking	57.81 (7.72)	52.82 (5.70)	9.29**	.10
Aggressive behavior	57.59 (8.59)	53.02 (6.75)	4.78*	.05

Note. Higher scores reflect higher levels of clinical symptom. $df = 1, 90$; *$p < .05$, **$p < .01$.

Percentage Falling Above One Standard Deviation

For each of the summary scales, more students who were AR-WD received ratings falling above one standard deviation than students who were TDW (internalizing: AR-WD = 27.0 percent, TDW = 12.7 percent; externalizing: AR-WD = 29.7 percent, TDW = 7.3 percent; total behavior problems: AR-WD = 29.7 percent, TDW = 5.5 percent). For each summary scale, the percentages of AR-WD students were higher than normal expectations (16 percent).

Exploratory Examination of the CBCL—TRF Clinical Scales

For the individual clinical scales, the MANCOVA revealed a significant main effect for group, $F(8, 82) = 2.02, p = .05$. In follow-up analyses, significant ($\alpha = .05$) group differences were found on five of the eight clinical scales after correcting for multiple comparisons (highest critical p-value = .55) using the B–H correction. As can be seen in Table 3, significant group differences were found for social problems, $F(1, 90) = 5.09, p = .02, \eta_p^2 = .05$; thought problems, $F(1, 90) = 10.471, p < .01, \eta_p^2 = .11$; attention problems, $F(1, 90) = 6.17, p = .01, \eta_p^2 = .07$; rule-breaking behavior, $F(1, 90) = 9.28, p < .01, \eta_p^2 = .10$; and aggressive behavior, $F(1, 90) = 4.78, p = .03, \eta_p^2 = .05$. The effect sizes for these clinical scales ranged from small to large.

Grade 3

Covariates

Preliminary results indicated that there were no significant differences in AR-WD and TDW groups in Grade 3 on sex, $\chi^2 (1) = 1.33, p = .25$; race, $\chi^2 (4) = 2.21, p = .70$; ethnicity, $\chi^2 (1) = 2.37, p = .12$; maternal education, $\chi^2 (8) = 10.78$ $p = .21$; IEP status, $\chi^2 (1) = 2.73, p = .10$; or ADHD status, $\chi^2 (1) = 2.37, p = .12$. The groups differed significantly on chronological age, $t (67) = -3.18, p < .01$, and on reading

ability, $t (67) = 13.21, p < .01$, with students who were AR-WD being older and having lower reading levels. Therefore, all subsequent MANCOVAs at Grade 3 were conducted with chronological age and reading ability as covariates.

Main Effects

For the CBCL–TRF summary scales, the MANCOVA did not produce a significant main effect for the grouping variable, $F(3, 63) = .81, p = .49$. Therefore, follow-up univariate procedures were not conducted.

Percentage Falling Above One Standard Deviation

At Grade 3, more students who were AR-WD than students who were TDW received teacher ratings on the CBCL–TRF falling above one standard deviation on the internalizing (AR-WD = 23.1 percent; TDW = 4.7 percent) and total behavior problem summary scales (AR-WD = 19.2 percent; TDW = 11.6 percent). In contrast, the percentage of students who were TDW falling above one standard deviation on the externalizing behaviors summary scale exceeded those for students who were AR-WD (AR-WD = 15.4 percent; TDW = 20.9 percent). The percentages of AR-WD students were higher than normal expectations (16 percent) on the internalizing and total problem behavior summary scales, while within normal expectations for both groups on externalizing behaviors.

Exploratory Examination of the CBCL—TRF Clinical Scales

For the individual clinical scales, the MANCOVA did not reveal a significant main effect for the grouping variable, $F(8, 59) = 1.41, p = .21$. Follow-up procedures were not conducted due to a null effect.

Grade 4

Covariates

At Grade 4, the groups were not significantly different on race, $\chi^2 (4) = 2.05, p = .72$; maternal education, $\chi^2 (8) = 14.42, p = .07$; IEP status, $\chi^2 (1) = .89, p = .35$; or age, $t (101) = -1.44, p = .08$. There were, however, significant differences found for sex, $\chi^2 (1) = 7.17, p = .01$ (AR-WD = 19 males, five females; TD = 37 males, 40 females), ADHD status, $\chi^2 (1) = 8.05, p = .01$, ethnicity, $\chi^2 (1) = 4.22, p = .05$, and reading ability, $t (101) = 3.84, p < .01$. Therefore, all subsequent MANCOVAs were conducted with sex, ADHD status, ethnicity, and reading ability as covariates.

Main Effects

Inspection of the differences between groups in fourth grade on the CBCL–TRF summary scales did not reveal a significant main effect, $F (3, 92) = 2.00$, $p = .12$. Therefore, follow-up univariate procedures were not conducted.

Percentage Falling Above One Standard Deviation

For each of the summary scales, more students who were AR-WD than students who were TDW received ratings falling above one standard deviation (internalizing behavior: AR-WD = 29.2 percent, TDW = 15.6 percent; externalizing behavior: AR-WD = 37.5 percent, TDW = 10.4 percent; total behavior problems: AR-WD = 37.5 percent, TDW = 14.3 percent). The rates of AR-WD being more than one standard deviation above the mean were much higher than normal expectations (16 percent) for all three summary scales.

Exploratory Examination of the CBCL—TRF Clinical Scales

For the individual clinical scales in fourth grade, there was no significant main effect for the group variable, $F(8, 87) = .91$, $p = .05$; consequently, follow-up univariate procedures were not conducted.

DISCUSSION

The current study is among the first to examine the social-behavioral difficulties of students who are AR-WD in Grades 1 through 4. Existing research has largely examined students with SLD across impairments, leading to the presumption that SLD affects behavior in universal manners across reading, writing, and math impairments.

In this investigation of students who are AR-WD, we found significant main effects for group differences only at Grade 2. In this grade, students who were AR-WD were rated as having more externalizing and total behavior problems than their peers who were TDW. Similarly, exploratory analyses of the clinical scales did not indicate a significant difference at Grades 1, 3, or 4. At Grade 2, however, significant differences were found on five of the eight clinical scales (social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behavior), with students who were AR-WD receiving higher ratings (i.e., more symptoms) than students who were TDW.

Interestingly, while no significant differences were found for the main effects or for the clinical scales at any grade other than Grade 2, there were higher proportions of students who were AR-WD receiving teacher ratings one standard deviation above the mean, indicative of clinical levels of behavioral concern, on at least one summary scale at all grade levels except Grade 1. In Grade 1, more students who were TDW received teacher ratings one standard deviation above the mean or greater on all three summary scales.

Taken together, these findings share both consistencies and inconsistencies with Alevriadou and Giaouri (2016), who showed that fifth grade students identified with a SLD-W exhibited attention deficits and low self-esteem. In the current study, AR-WD does present more frequently with behaviors rising to clinical significance, when examining the percentage of students' scores falling above one standard deviation. While that is the case, significant differences between TDW and AR-WD were only evident on either the summary or the clinical scales at one grade level (Grade 2).

Perhaps the differences between our findings and those of Alevriadou and Giaouri (2016) are related to the age of the participants in our sample and the measures used. Alevriadou and Giaouri (2016) had a slightly older sample of students (fifth graders) than our first- through fourth-grade sample. It is possible that the emergence of elevated levels of social behaviors for children who are AR-WD occurs later in development, perhaps as a result of increased demands for written production (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). The importance of the rater may also be a critical difference in these findings. Alevriadou and Giaouri (2016) used self-report, while this study relied on teacher report. Teachers' perceptions of students and students' own self-perceptions are likely to be quite different (Connolly, Kavanagh, & Viswesvaran, 2007). Finally, it is important to note that Alevriadou and Giaouri (2016) did not include any students who were TDW in their sample, so comparisons across groups were not available. It is possible that their findings would have been similar for a comparison group of students who were TDW.

When considering this study in relation to the larger literature on SLDs and social-behavioral difficulties, these findings do not provide systematic evidence that elementary school children who are AR-WD are more likely to present more internalizing and externalizing behaviors than their peers who are TDW. These findings stand in contrast to previous studies indicating that children with SLDs are more likely to have social-behavioral difficulties than their peers who are TD (Capozzi et al., 2008; Diakakis et al., 2008; McDermott et al., 2006; Nelson & Harwood, 2011). This finding may suggest that teachers perceive the behaviors of students who are AR-WD only somewhat similarly to those of students with other SLDs. Nevertheless, the inconsistency of the severity of these behaviors across grade levels remains an ongoing area of scientific inquiry.

Implications

These findings are important for school personnel as they consider the interrelatedness of students' academic difficulties and behavioral challenges. Interventions that target writing may incidentally improve student behavior (Lane et al., 2010; Niesyn, 2009). In other words, as students learn new strategies and skills for writing, there should be a decrease in writing difficulties, something that could also contribute to the decrease in the occurrence of internalizing and externalizing behaviors. Therefore, the provision of writing support in the earliest grades may provide a double return on investment

in both academic achievement and reduced student internalizing and externalizing behaviors for both students who are AR-WD and students who are TDW. Likewise, improved understanding of the relation between writing achievement and behavior by teachers may generate increased attention to the potential interrelatedness of the two, just as has been noted in other areas of SLD. This improved understanding may affect the ways teachers respond emotionally to students who struggle with writing. Similarly, it could encourage the use of interventions that help students self-regulate while writing.

Existing interventions predominantly focus on students with a diagnosed emotional and behavioral disorder, and focus primarily on the domain of reading development (Rivera et al., 2006). One notable exception is Self-Regulated Strategy Development (SRSD: Harris, Schmidt, & Graham, 1998), an intervention that teaches students composition strategies while also developing positive attitudes about writing. Many studies have demonstrated the efficacy of SRSD in students with and without diagnosed disabilities (Alharbi, Hott, Jones, & Henry, 2015; Mason et al., 2017; Sartika & Rachmanita, 2017). While the current study did not find systematic differences in behavior between students who are AR-WD and students who are TDW, there were multiple instances across both groups where the percentage of students with behaviors in the clinical range (above one standard deviation) exceeded normal expectations (16 percent). Therefore, it seems likely that interventions that simultaneously target writing and behavior, such as SRSD, may be beneficial for all students (Ennis, Harris, Lane, & Mason, 2014).

Limitations

Although this study adds to the literature by examining the social-behavior of children who are AR-WD in comparison to children who are TDW, it does have limitations. First, we had a small sample size. This small sample size restricted our ability to examine variable interactions, and to investigate differences between specific groups within our sample such as low-achieving students who did not evidence being AR-WD. Second, although the CBCL–TRF is a standardized rating scale, it was only completed by one rater per child. Given the inherent bias in rating scales (Wolfe & Song, 2014), the findings may have been affected by rater (i.e., teacher) variability, and perhaps the use of multiple raters would have yielded different outcomes (and at the same time, increased interpretative challenges). Likewise, the presence of an IEP and ADHD diagnosis were ascertained by parent report. While we knew whether a student had an IEP, we were not privy to their specific goals and objectives, and consequently were not able to determine whether writing skills were being addressed. Similarly, our available data did not permit validation of the ADHD diagnosis.

Third, the small sample size at first grade, due to the request by the school system to change our measure, may have contributed to the unique finding at that grade level where more students who were TDW presented with behavioral concerns greater than one standard deviation. Likewise, the power analysis indicated that we may not have had enough power to detect true differences except in Grade 2, where significant differences were identified. Nevertheless, it does seem as though the relation between behavior and SLD may not be as uniform across impairments as was previously thought, and further investigation is warranted.

Future Studies

There are other potential avenues to understand the relation between AR-WD and social-behavioral difficulties that future studies could undertake. First, longitudinal studies could offer insight into how students' writing ability and internalizing and externalizing behaviors may develop and impact one another over time. It is possible that as students gain more experience with writing across grades, the cumulative effect of these experiences may interact with their internalizing and externalizing behaviors. Such an interaction may contribute to students with fewer internalizing and externalizing behaviors growing at a greater rate in writing than their peers who display more internalizing and externalizing behaviors. It will also be important for future investigations to consider the presence of current writing goals on an IEP to distinguish further between the relations between behavior and AR-WD, and between behavior and SLD-W. Future investigations into the effects of writing interventions on social-behavioral difficulties will also be important to pursue. These investigations could benefit both students who are AR-WD and TDW.

Future studies may also want to consider the use of multiple raters with different relationships with the student, or including students' self-reports of their behaviors. The inclusion of multiple raters would provide a more robust picture of students' behaviors, and would lessen the possibility of teacher rater variance being a contaminant in the outcomes; the integration of these types of data, however, also presents interpretative challenges. It would also allow researchers to differentiate how students, parents, and teachers separately perceive the behaviors of students who are AR-WD. Similarly, the use of other approaches, such as observations of student behavior in conjunction with teacher ratings, could lead to a different set of findings.

CONCLUSIONS

This study is one of the first to investigate the presence of social-behavioral difficulties in young elementary school students who are AR-WD. These findings vary across grade levels, but indicate that students who are AR-WD are no more likely to exhibit internalizing and externalizing behaviors than students who are TDW. These findings illustrate the benefits of studying behavior across different types of SLDs, as these findings stand in contrast to the findings of other studies that have looked at general SLD impairment rather than looking at a specific domain of impairment.

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