Mental problems in children with specific learning disabilities

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Introduction

Research has revealed that students with learning difficulties (LD) experience higher rates of anxiety and depression compared to their peers without LD (Brunelle et al., 2020; Donolato et al., 2022; Francis et al., 2019; Klassen et al., 2013; Maag & Reid, 2006; Nelson & Harwood, 2011a, b). Most reviews included studies on individuals with unspecified learning difficulties (Brunelle et al., 2020; Klassen et al., 2013; Maag & Reid, 2006; Nelson & Harwood, 2011a, b) and we do not know if some types of LD experience more internalizing problems than others. Several studies have shown that children with reading or math difficulties might be at greater risk for mental health problems (i.e., depression, anxiety, somatic complaints, withdrawal).

However, there have only been a few studies that have explored comorbid reading (RD) and math (MD) difficulties, and we still do not know if children with comorbid disabilities (i.e., children who have both reading and math disabilities) experience more mental health problems than children with single disabilities (i.e., either reading or math). Thus, the purpose of this project is to investigate whether children with comorbid RDMD experience greater anxiety and depression compared to children without comorbidities. This project is particularly important in light of recent findings that Covid-19 has amplified the mental health problems in schools and that children with disabilities are at greater risk for these kinds of problems.

Methods

PARTICIPANTS

The sample included 33 Grade 5 and 6 children with RD (51.5% female; Mage = 10.8), 35 children with MD (60.0% female; Mage = 10.8), 37 children with comorbid RDMD (45.9% female; Mage = 10.8), and 42 chronological-age (CA) controls (64.3% female; Mage = 10.8). All children were assessed on reading and mathematics, and their teachers rated their anxiety and depression issues.

- To be included in the RD group, participants were required to score below a standard score of 85 on both the Wide Range Achievement Test-5 (WRAT-5) Word Reading (Wilkinson & Robertson, 2017) and the Test of Word Reading Efficiency-2 (TOWRE-2; Torgesen et al., 2012), and above a standard score of 90 on both the WRAT-5 Math Computation (Wilkinson & Robertson, 2017) and the Wechsler Individual Achievement Test- 3 (WIAT-3) Math Fluency (Wechsler, 2009).
- For the MD group, participants needed to score below a standard score of 85 in mathematics and above 90 in reading.
- For the RDMD group, participants had to score below a standard score of 85 in both reading and mathematics. To qualify for the CA control group, participants had to score above a standard score of 90 in both reading and mathematics.
- Teachers of the participating students also contributed by rating their students' internalizing problems using the Behavior Assessment System for Children, third edition (BASC-3; Reynolds & Kamphaus, 2015).

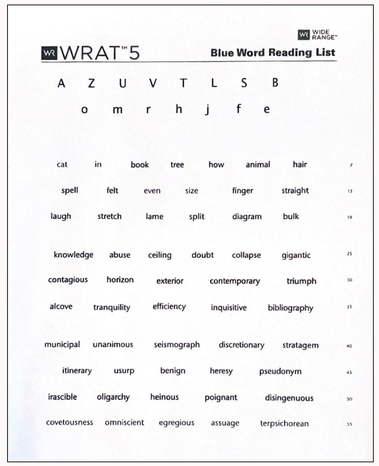

Fig. 1 Word Reading task from the WRAT-5

MATERIALS

- Reading was assessed using the Word Reading task from the WRAT-5 (Wilkinson & Robertson, 2017) and the Sight Word Reading Efficiency and Phonemic Decoding Efficiency tasks from the TOWRE-2 (Torgesen et al., 2012). In the Word Reading task, children were asked to read words that increased in difficulty, with the task being discontinued after five consecutive errors. The maximum possible score was 70. The Sight Word and Phonemic Decoding tasks required children to read lists of real words, in increasing difficulty (max = 108), and nonwords (max = 66) as quickly as possible. Scores were based on the total number of correct responses in 45 seconds, then converted to scaled scores and summed to create a composite reading efficiency score.

- Mathematics was assessed using the Math Computation task from the WRAT-5 (Wilkinson & Robertson, 2017) and the Math Fluency task from the WIAT-3 (Wechsler, 2009). In the Math Computation task, children were asked to solve as many calculations as possible within a 15-minute time limit, with a maximum score of 55. In the Math Fluency task, children were required to solve as many written addition (max = 48), subtraction (max = 48), and multiplication problems (max = 40) as possible within a 60-second time limit for each type of problem. For all three tasks, the participant's score was based on the total number of correct responses. The raw scores from addition, subtraction, and multiplication were converted to scaled scores, which were then summed to create a composite math fluency score.

- Mental health problems were assessed using the anxiety and depression teacher-rating scales (ages 6-11) from the BASC-3 (Reynolds & Kamphaus, 2015). These scales consist of four-point ratings (ranging from "never" to "almost always") and include statements about students' anxiety (e.g., "appears tense," "is easily stressed," "worries about things that cannot be changed") and depression (e.g., "cries easily," "is sad," "is negative about things"). The anxiety scale included nine statements, while the depression scale included 11 statements.

Results

Four analyses of variance (ANOVA) were conducted to assess group differences in anxiety and depression, with Bonferroni correction applied to post hoc tests. Effect sizes (η^2) were calculated for all tasks, with benchmarks provided by Cohen (1988) for small ($\eta^2 = 0.01$), medium ($\eta^2 = 0.06$), and large ($\eta^2 = 0.14$) effects.

For anxiety, the ANOVA revealed a significant main effect of group, $F(3, 143) = 3.061$, $p = .030$, $\eta^2 = .06$. Post hoc comparisons indicated that the RDMD group scored significantly higher than the CA group ($p = .039$), with no significant differences between the RDMD group and either the MD or RD groups. Similarly, the ANOVA for depression showed a significant main effect of group, $F(3, 143) = 3.595$, $p = .015$, $\eta^2 = .07$. Post hoc tests revealed that the RDMD group scored significantly higher than the CA group ($p = .032$), with no significant differences between the RDMD group and the MD or RD groups.

	RD ($n = 33$)		MD ($n = 35$)		RDMD ($n = 37$)		CA ($n = 42$)		ANOVAs		
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	$F(3, 143)$	MSE	η^2
Anxiety	51.33	9.88	54.60	12.79	57.86	12.80	50.57	11.12	3.061*	137.4	.06
Depression	49.97	11.13	54.51	15.34	55.19	12.05	47.52	9.20	3.595*	144.5	.07

Fig. 2 Means, Standard Deviations (SD), and ANOVA Results for Anxiety and Depression Across RD, MD, RDMD, and CA Groups

Discussion

- ANOVA revealed that children with comorbid RDMD exhibited significantly higher levels of anxiety and depression compared to CA controls only. These findings suggest that children with comorbid RDMD may be at greater risk for anxiety and depression than children without difficulties, but not when compared to those with single difficulties (RD or MD).

- A limitation in this study was the reliance on accurate teacher ratings as some teachers' answers did not align when completing the reverse-coded four point rating scales. Future iterations of this study should consider having multiple teachers who know the student to complete the teacher-rating scales to increase accuracy.

- The findings of this study can help identify students at greater risk for anxiety and depression, and guide intervention efforts for achieving academic success and better mental health outcomes.

- Study results suggest that addressing students' learning disabilities may decrease the mental health problems (anxiety and depression) that this population experiences disproportionately. This work can be foundational in guiding professional development for teachers and clinicians.

- Future studies should consider examining the long-term mental health outcomes of children with RDMD as well as the extent to which specific tailored interventions reduce their risk for anxiety and depression.

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