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The Relationship Between Reading Anxiety and General Anxiety in 7-10-year-old Children With Reading Difficulties

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The Relationship Between Reading Anxiety and General Anxiety in 7-10-year-old Children With
Reading Difficulties

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Honors Thesis

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Abstract

Although it is established that children with learning disabilities tend to experience Reading Anxiety, less is known about this population's extension to Generalized Anxiety. The current study presents findings from two cohorts of elementary-age children (N=51) over the course of two years during the summer BRAINCamp on the Storrs campus of the University of Connecticut. The current study explores if children with reading and math disabilities, who tend to have anxiety in reading performance, extend Reading Anxiety to the broader domain of Generalized Anxiety. The sample consisted of second to fourth-grade students who met the criteria for learning difficulties and completed all tests assessing anxiety and reading and math performance. The findings demonstrate a correlation between Reading Anxiety and General Anxiety where high reading anxiety extends to high generalized anxiety in 58.33% of participants. General Anxiety had a significant correlation with Mastery Avoidance in both Reading *and* Math. The findings also suggest a correlation between Reading Anxiety and Mastery Avoidance in both Reading *and* Math. The present study offers a more nuanced understanding of the extension of Reading Anxiety to Generalized Anxiety in children with learning disabilities.

Keywords: reading anxiety, generalized anxiety, learning disabilities, reading performance, math performance, adaptive learning

Introduction

Reading anxiety can have detrimental effects on the wellbeing of children in school and beyond. Academic proficiency in skills such as reading and math is essential for achievement. Children struggling in these capacities will experience disadvantages in life (Elksnin & Elksnin, 2004; Saga et al., 2022), extending from elementary education to college, given the importance of reading comprehension for learning. These challenges include social, emotional, and behavioral obstacles (Morrison & Cosden, 1997; Vaughn & Elbaum, 1999; Visser et al., 2020). The association between learning disabilities and non-normative academic performance (i.e., poor reading comprehension, reading fluency, phonological awareness, etc.) has long been established (Arens et al., 2017; Pollack et al., 2021; Wu et al., 2014). Extending beyond difficulties in the classroom, children with learning disabilities often experience more emotional difficulties than typical peers do (Elksnin & Elksnin, 2004; Gresham & Reschly, 1986; Vaughn & Elbaum, 1999), so it is important to identify intervention targets for children with reading difficulties or children with overlapping reading and math difficulties given the link of reading anxiety to general anxiety and academic achievement (Grills et al., 2013).

Early elementary school (i.e., second to fourth-grade) is a critical developmental period for the foundational skills of reading, so it is essential to elucidate the impacts of reading anxiety on struggling readers in this age group to identify targets of interventions (Macdonald et al., 2021). Reading disabilities are one of the most prevalent developmental disabilities among school-aged children, manifesting in poor reading comprehension and performance (Grills et al., 2013). The prevalence rate of Reading Disabilities is estimated at 5.2% in the United States of America (Cortiella & Horowitz, 2014). The specific domain of Reading Anxiety is a situation-specific phobia that refers to an unpleasant emotional reaction experienced by

individuals when reading (Piccolo et al., 2017). Reading Anxiety is common among those with Reading Disabilities and impacts achievement in the classroom as, academically, higher anxiety leads to lower motivation (Pollack et al., 2021). Motivation is tied to performance, which enhances growth and a sense of purpose. Children with anxiety, however, may not feel motivation since higher anxiety leads to avoidance (Grills et al., 2013). Students with more motivation would likely perform better than those without, especially academically. The literature has confirmed that having higher motivation leads to higher reading performance in elementary and middle school (Retelsdorf et al., 2011; Froiland and Oros, 2014). Reading anxiety is especially important to investigate in children with learning disabilities since they have higher rates of anxiety than typically developing peers, which can extend to general anxiety (Carroll & Iles, 2006; Mammarella et al., 2016; Thakkar et al., 2016; Visser et al., 2020).

Reading Anxiety in academic contexts is hypothesized to extend to broader domains such as General Anxiety which has considerable impact on one's life, so the correlation is important to explore (Grills et al., 2013). The impacts of learning disabilities and high levels of anxiety result in lower physical quality of life, emotional quality of life, and academic quality of life than typically developing groups (Saga et al., 2022). This general anxiety subsequently impacts their overall wellbeing and self-esteem (Alesi et al., 2012). Despite the theorized relationship between Reading Anxiety and General Anxiety, few studies have examined this connection with this specific age group (i.e., second- to fourth-grade students) in both students with Reading Disabilities and Comorbid Math and Reading Disabilities as they commonly overlap (Macdonald et al., 2021).

Specific dimensions of achievement goal orientation, specifically Adaptive Learning Avoidance, are thought to be associated with poor academic performance (Harackiewicz et al.,

2002). The present study investigates the relationship with the Mastery-avoidance goal component of The Modified Patterns of Adaptive Learning Scales since avoidance is thought to be linked with General Anxiety. Different goal orientations are defined as “different ways of approaching, engaging in, and responding to achievement situations” (Ames, 1992). Avoidance goals refer to the avoidance of shortcomings and demonstrate concern towards the inability to master tasks or appear less than those completing similar tasks (Ames, 1992; (Eum & Rice, 2011). Performance-avoidance goal orientations have been associated with poor academic performance (Harackiewicz et al., 2002) so the link between this specific dimension of achievement goal orientation and General Anxiety is a consistent theoretical framework since poor academic achievement and self-oriented perfectionism in achievement can lead to Anxiety (Stoeber et al., 2009). To that end, the role of specific dimensions of achievement goal orientation in performance, specifically Adaptive Learning Avoidance, is an important exploration associated with Reading Anxiety and General Anxiety for groups with learning disabilities.

The present study

The primary purpose of the study was to evaluate the expansion of generalized anxiety in children with learning disabilities to reading anxiety and its correlations to Adaptive Learning. To address this question, two main research goals drove this study. The first was to see if Reading Anxiety correlates with Generalized Anxiety. The second was to determine if General Anxiety correlates with Adaptive Learning.

Due to a limited number of students only identified as having a Math Disability in the present study, we proceeded with students whom we identified as having a Reading Disability

and students whom we identified as having a comorbid Math and Reading Disability because of how often the two overlap in those with Learning Disabilities.

Methods

Participants

This study included participants from reading intervention summer camps on the Storrs, CT campus of the University of Connecticut. 51 participants were included in the study (31 males, 21 females, mean age = 104.38 months, SD = 8.076, range = 92 - 120). All participants met the following inclusion criteria: (1) English as a primary language used at home, (2) no reported incidence of hearing loss, (3) no history of developmental disorders such as autism, (4) non-verbal reasoning in the typical range or higher expressed with *T scores* ≥ 33 (equivalent to a standard score of 75), (5) meeting the criteria of reading or math difficulties which was defined as having a standard score < 90 on two or more measures for reading performance (TOWRE: SWE, TOWRE: PDE, WJ3 Letter Word Identification, and/or WJ3 Word Attack, See below for detailed descriptions of the measures) and a standard score < 90 on one or more measure for math performance (WJ3 Calculation and/or WJ3 Math Fluency).

University of Connecticut Institutional Review Board approved all study procedures and informed written consent and assent were obtained from parents and children, respectively.

Procedure

All self-report questionnaires were administered during the two summer camps, respectively.

The total administration time (including assessment time from another study if participants had already completed the assessments from another study) was approximately five hours.

Standardized tests were administered to target reading, math, and cognitive abilities that are considered the most theoretically-linked characteristics (e.g. reading, decoding, phonological awareness) of a reading disability, those to rule out neurodevelopmental disorders (e.g. IQ), and

those that have been cited to demonstrate a role in reading disabilities (e.g. lexical/semantic, morphological and syntactic processing).

Materials/Measures

Measures to determine inclusion for the present study:

1. WASI-II- Matrix Reasoning

The Wechsler Abbreviated Scale of Intelligence (WASI-II)- Matrix Reasoning (30-item) is a subtest that measures students' intellectual ability and cognitive capabilities via assessing non-verbal reasoning (Wechsler, 2011). Matrix Reasoning measures a student's problem-solving, nonverbal abstract reasoning, and perception organization abilities (Wechsler, 2011). The present study used the Matrix Reasoning subtest where students are presented with an unfinished series or matrix and then choose the best answer choice that completes the matrix. The Matrix Reasoning score was used as an inclusion criterion for the present study where children needed non-verbal reasoning in the typical range or higher expressed with $T\ scores \geq 33$ (equivalent to a standard score of 75). The WASI-II is scored based on the total number of correct answers and the T -score is based on age at the time of administration.

Measures to determine Reading difficulties:

Criteria to determine Reading difficulties included having a standard score < 90 on two or more measures for reading performance (TOWRE: SWE, TOWRE: PDE, WJ3 Letter Word Identification, and/or WJ3 Word Attack) to be included in the Reading Disability group.

1. TOWRE-2

The Test of Word Reading Efficiency Second Edition (TOWRE-2) measures fluency in sight word reading abilities and phonemic decoding skills. Both the Sight Word Efficiency (SWE) and Phonemic Decoding Efficiency (PDE) sub-tests of the Test of Word Reading Efficiency

(Torgesen et al., 2012) were used to measure students' reading fluency performance in this study. Both SWE and PDE provide students with 45 seconds to read a list of words. The SWE sub-test contains real words and the PDE contains pseudowords. TOWRE-2 Sight Word Efficiency and TOWRE-2 Pseudo Word Efficiency are both scored based on the total number of words read correctly within the administration timeframe of the tests (45 seconds) and then a standard score was extracted based on age at the test date of each test.

2. WJ3 Word Attack

The Woodcock-Johnson III Tests of Achievement- Word Attack (WA) extended-battery sub-test measures reading decoding and phonetic decoding of unfamiliar words. Initially, students are prompted to produce the sounds of several letters followed by being asked to pronounce nonsense words of increasing complexity (Woodcock et al., 2001; 2007). WJ3 Word Attack (WA) is scored based on the total number of correct answers and then a standard score was extracted based on age at the test date.

3. WJ3 Letter Word-Identification

The Woodcock-Johnson III Tests of Achievement- Letter Word Identification (LWID) sub-test measures reading decoding. The skills tested involve the cognitive processes of feature detection and analysis for letters as well as recognition of visual word forms and phonological access to pronunciations associated with visual word forms (familiar and unfamiliar words) (Woodcock et al., 2001; 2007). The Letter Word Identification task also requires activating and outputting representations of the sound patterns of the words, based on phonology via oral production. Words are read in order of increasing difficulty in the form of a list. WJ3 Letter Word Identification (LWID) is scored based on the total number of correct answers and then a standard score was extracted based on age at the test date.

Measures to determine Math difficulties:

While Math Difficulties are not the focus of the present study, Math Difficulties are highly comorbid with Reading Difficulties, so we include this comorbidity to better understand a wider array of academic difficulties that people with Reading Difficulties may encounter. Criteria to determine Math Difficulties included having a standard score < 90 on one or more measures for reading performance (WJ3 Calculation and/or WJ3 Math Fluency) to be included in the Math Disability group.

1. WJ3 Calculation

The Woodcock-Johnson III Tests of Achievement- Calculation sub-test measures math achievement. Items in this measure ask participants to write numbers and complete numerical operations (i.e. addition, subtraction, multiplication, division) progressing to geometric, logarithmic, and trigonometric operations (Woodcock et al., 2001; 2007). WJ3 Calculation is scored based on the total number of correct answers and then a standard score was extracted based on age at the test date.

2. WJ3 Math Fluency

The Woodcock-Johnson III Tests of Achievement- Math Fluency (MF) sub-test measures math achievement and numerical facility. The MF measures a student's ability to solve simple addition, subtraction, and multiplication facts quickly (Woodcock et al., 2001; 2007). The WA sub-test is individually administered, norm-referenced, and has a three-minute time limit. WJ3 Math Fluency (MF) is scored based on the total number of correct answers and then a standard score was extracted based on age at the test date.

Criteria to Determine Anxiety and Adaptive Learning:

Criteria to determine anxiety cutoffs included a score of ≥ 24 on the BASC-2 to have Generalized Anxiety and a score of ≥ 36 on the Reading Anxiety Questionnaire to have Reading Anxiety in the present study. The raw score of ≥ 24 for a cutoff point for General Anxiety was determined since the “Sometimes” = 2 on the BASC-2 score and if participants chose at least that answer for each Likert-type scale question, their score would be ≥ 22 before adding in the two true/false questions which “true” answers indicate anxiety and are coded as “1” but reverse coded in the total summation for the BASC-2, summing to ≥ 24 for a cutoff point. For the Reading Anxiety Questionnaire, a similar procedure was used since there are 19 total questions administered with one filler question that was removed for the analysis bringing the new total to 18 questions for the analysis. The raw score of ≥ 36 for a cutoff point for Reading Anxiety was determined since the “Sometimes” = 2 on the Reading Anxiety Questionnaire and if participants chose at least that answer for each Likert-type scale question, their score would be ≥ 36 with the removed filler question. Adaptive Learning scores were determined by having two scores: one for the Mastery-approach goal and one for the Mastery-avoidance goal which were each summed individually.

1. BASC-2 Self Report

The Behavior Assessment System for Children – Second Edition (Reynolds & Kamphaus, 2004) in the present study consisted of 13 total questions about Anxiety. The BASC-2 is a diagnostic tool designed for the assessment of behavior and self-perceptions of children to young adults aged 2-25 years. The intended purpose of the BASC-2 measure is evaluation, intervention, and program planning used in conjunction with the DSM-IV (American Psychiatric Association, 2013). The self-report scale has 11 items to rate on a four-point Likert-type scale (1 = never; 5 = always). The scale also included two “true/false” questions, totaling 13. An example from the

Likert-type self-report scale is “I worry but I don't know why.” An example from the “true/false” section of the self-report scale is “I often worry about something bad happening to me” (Reynolds & Kamphaus, 2004). The score of the BASC-2 is based on the total sum of answer choices (1 = never; 5 = always). A higher score indicated higher anxiety levels and a lower score corresponded with lower anxiety levels. The BASC-2 items used in this study are included in Appendix A.

2. Reading Anxiety Questionnaire

The Reading Anxiety Questionnaire consisted of 19 questions total assessing anxiety about reading-related tasks including instruction and tests (Grills, unpublished). Question number 9 served as a filler question asking participants to select “Sometimes” to ensure participants were paying attention and was removed for the analysis which resulted in 18 questions being summed for the total score. The self-report scale has the items to rate on a four-point Likert-type scale (1 = never; 5 = almost always). A high score indicated by the scale demonstrates higher levels of reading-related anxiety whereas lower scores demonstrate lower levels of reading-related anxiety. An example from the self-report scale is “I feel sweaty and hot when I have to read something with a time limit.” (Grills, unpublished). The score of the Reading Anxiety Questionnaire is based on the total sum of answer choices (1 = never; 5 = almost always). A higher score indicated higher anxiety levels and a lower score corresponded with lower anxiety levels. The Reading Anxiety Questionnaire items used in this study are included in Appendix B.

3. Modified Patterns of Adaptive Learning Scales Reading

The Modified Patterns of Adaptive Learning Scales Reading consisted of four sections (Mastery-approach goal, Performance-approach goal, Performance-avoidance goal, and Mastery-avoidance goal) culminating in 23 total questions (Midgley et al., 2000). The self-report

scale has the items to rate on a five-point Likert-type scale (1 = never; 5 = always true). Mastery-approach goal (six items) and Mastery-avoidance goal (six items) were used for this study to measure reading anxiety. You will have two scores representing the Mastery-approach goal and the Mastery-avoidance goal to represent anxiety in reading. These two factors were chosen from The Modified Patterns of Adaptive Learning Scales Reading based on the relevance of the questions addressing aspects of Anxiety and Adaptive Learning unlike the other components of the Performance-approach goal and Performance-avoidance goal which focused on performance rather than approaches to mastery or avoidance to mastery in reading. The Modified Patterns of Adaptive Learning Scales Reading items used in this study are included in Appendix C.

4. Modified Patterns of Adaptive Learning Scales Math

The Modified Patterns of Adaptive Learning Scales Math consisted of four sections (Mastery-approach goal, Performance-approach goal, Performance-avoidance goal, and Mastery-avoidance goal) culminating in 23 total questions (Midgley et al., 2000). The self-report scale has the items to rate on a five-point Likert-type scale (1 = never; 5 = always true). Mastery-approach goal (six items) and Mastery-avoidance goal (six items) were used for this study to measure math anxiety. You will have two scores representing the Mastery-approach goal and the Mastery-avoidance goal to represent anxiety in Math. These two factors were chosen from The Modified Patterns of Adaptive Learning Scales Math based on the relevance of the questions addressing aspects of Anxiety and Adaptive Learning unlike the other components of the Performance-approach goal and Performance-avoidance goal which focused on performance rather than approaches to mastery or avoidance to mastery in math. The Modified Patterns of Adaptive Learning Scales Math items used in this study are included in Appendix D.

Results

To get a description of the demographics and description of scores participants had for inclusion criteria measures, a descriptive statistic table was created.

Table 1

Descriptive Statistics of Participant Demographics and Score Measures

Measure	N	Minimum	Maximum	Mean	Std. Deviation
Grade	51	2	4	2.96	.720
Age (months)	52	92	120	104.38	8.076
WASI <i>t-score</i>	50	25	65	43.82	8.080
TOWRE SWE	51	0	94	41.39	32.863
TOWRE PDE	51	55	106	74.84	10.542
WJ3 Letter Word Identification	46	51	115	86.78	13.719
WJ3 Word Attack	46	61	106	90.33	8.857
WJ3 Calculation	47	64	122	89.51	13.108
WJ3 Math Fluency	46	64	123	84.85	13.711

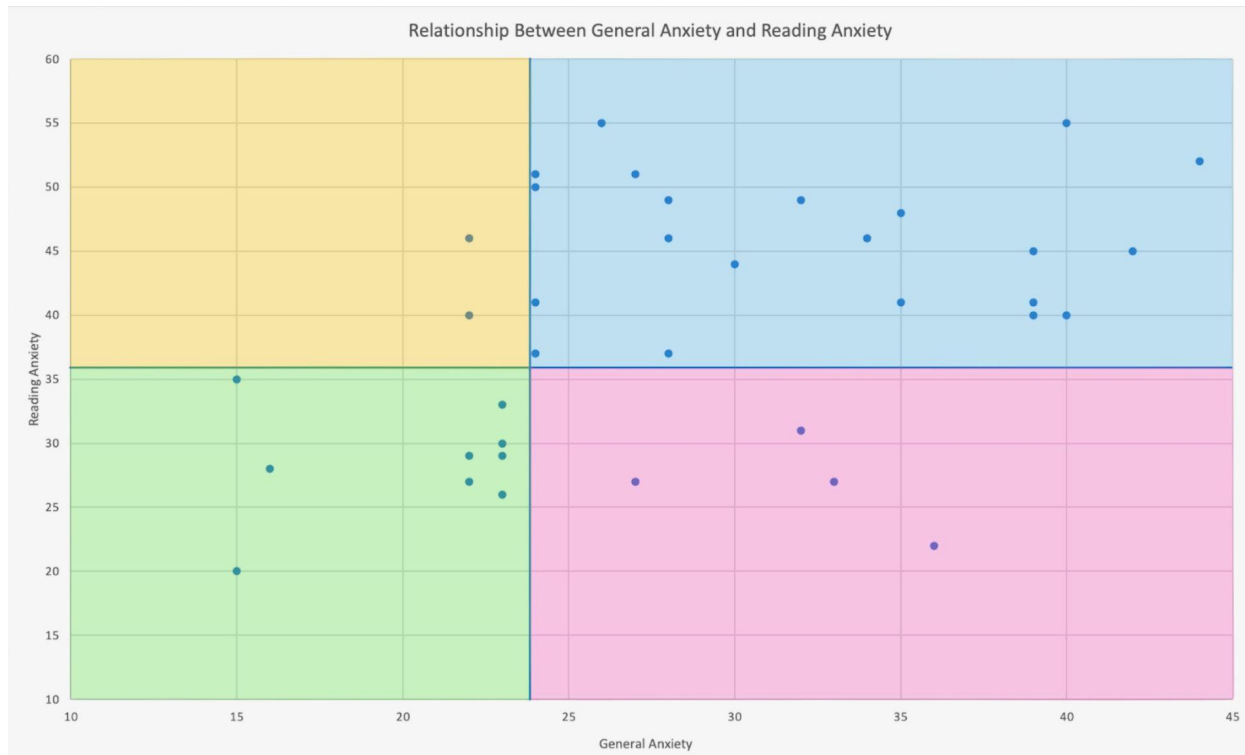
Note. This table demonstrates the descriptive statistics of the participants included in the study with both Reading Difficulties and Comorbid Reading and Math Difficulties.

To address the first question of the study, if reading anxiety expands to generalized anxiety, a scatterplot was created to demonstrate the relationship and group participants into four groups with cutoff points: low general anxiety and high reading anxiety, low general anxiety and low reading anxiety, high reading anxiety and high general anxiety, low reading anxiety and high

general anxiety. The cutoff points indicate the threshold, above which the participant with such score meets the criteria for Anxiety on that specific measure.

Figure 1

Relationship Between Reading Anxiety and Generalized Anxiety in Children with Reading Disabilities and Comorbid Reading and Math Disabilities



Note. This figure demonstrates the relationship between general anxiety and reading anxiety to address the first question of the study. The yellow quadrant represents low general anxiety and high reading anxiety, the green quadrant represents low general anxiety and low reading anxiety, the blue quadrant represents high reading anxiety and high general anxiety, and the pink quadrant represents low reading anxiety and high general anxiety. The cutoff points are 24 for General Anxiety scores and 36 for Reading Anxiety scores indicated by the blue lines.

To address the second question in the study, if general anxiety has a correlation with Adaptive Learning, correlation analyses were conducted. Table 1 represents the findings of the

analyses that show correlations between General Anxiety and Adaptive Learning in children with Reading Disabilities and comorbid Reading and Math Disabilities.

Table 2

Correlations Between Anxiety and Adaptive Learning in Children with Reading Disabilities and Comorbid Reading and Math Disabilities

Measure	1	2	3	4	5	6
1. BASC-2	—	.412*	-.189	.338*	.213	.498**
2. Reading Anxiety	.412*	—	-.177	.357*	-.078	.464**
3. Reading Mastery Approach	-.189	-.177	—	.298*	.461**	.057
4. Reading Mastery Avoidance	.338*	.357*	.298*	—	.470**	.694**
5. Math Mastery Approach	.213	-.078	.461**	.470**	—	.548**
6. Math Mastery Avoidance	.498**	.464**	.057	.694**	.548**	—

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Note. The table demonstrates the correlations between General Anxiety, Reading Anxiety, and Adaptive Learning measures (i.e. Reading Mastery Approach, Reading Mastery Avoidance, Math Mastery Approach, and Math Mastery Avoidance).

Participants (N=51, 31 males, 21 females) had a mean age of $M= 104.38$ months with $SD= 8.076$. Participants had a mean WASI t-score of $M= 43.82$ with $SD= 8.080$.

The creation of the scatterplot revealed that in the sample of individuals with Reading Disabilities and comorbid Math and Reading Difficulties with completion of all BASC-2 and Reading Anxiety Questionnaire questions (N= 36), 5.56% had low general anxiety and high reading anxiety, 25% had low general anxiety and low reading anxiety, 58.33% had high reading anxiety and high general anxiety, and 11.11% had low reading anxiety and high general anxiety.

We ran correlation analyses with two-tailed significance testing to measure the relationships between BASC-2 total scores for General Anxiety, Reading Anxiety, Reading Mastery Avoidance, Reading Mastery Approach, Math Mastery Avoidance, and Math Mastery Approach.

We predicted a correlation between Reading Anxiety and General Anxiety, which the results supported with a significant moderate correlation between Reading Anxiety and General Anxiety ($r_s = .412$, $n = 36$, $p = .013$), suggesting high reading anxiety is related to high general anxiety. This is supported by the scatterplot with 58.33% categorized in the high reading anxiety and high general anxiety quadrant, suggesting high reading anxiety expands to the domain of high general anxiety. The correlation between Reading Anxiety and General Anxiety is further supported as 25% were categorized in the low general anxiety and low reading anxiety quadrant. Only 5.56% had low general anxiety and high reading anxiety suggesting the relationship between Reading Anxiety and General Anxiety are correlated since the lowest number of people were categorized into this quadrant.

We predicted a correlation between General Anxiety and Mastery Avoidance from The Modified Patterns of Adaptive Learning Scales. The results supported this with a moderate correlation between General Anxiety and Reading Mastery Avoidance ($r_s = .338$, $n = 38$, $p = .038$), suggesting the Mastery Avoidance component of Adaptive Learning in Reading is

correlated with General Anxiety. The correlation between General Anxiety and Mastery Avoidance was also supported by a significant moderate correlation between General Anxiety and Math Mastery Avoidance ($r_s = .498$, $n = 39$, $p = .001$), suggesting the Mastery Avoidance component of Adaptive Learning in Math is correlated with General Anxiety.

The findings from the present study also support the predicted correlation between Reading Anxiety and Mastery Avoidance from The Modified Patterns of Adaptive Learning Scales. This was supported by a significant moderate correlation between Math Mastery Avoidance and Reading Anxiety ($r_s = .464$, $n = 39$, $p = .003$), suggesting the Mastery Avoidance component of Adaptive Learning in Math is correlated with Reading Anxiety. Similarly, the correlation between the Mastery Avoidance component of Adaptive Learning and Reading Anxiety was supported by a moderate correlation between Reading Mastery Avoidance and Reading Anxiety ($r_s = .357$, $n = 42$, $p = .020$), suggesting the Mastery Avoidance component of Adaptive Learning in Reading is correlated with Reading Anxiety. The Mastery Avoidance components of both Reading and Math from The Modified Patterns of Adaptive Learning Scales were correlated, which was supported by a strong significant moderate correlation between Reading Mastery Avoidance and Math Mastery Avoidance ($r_s = .694$, $n = 41$, $p < .001$), suggesting Avoidance in Reading extends and is correlated with Avoidance in Math.

There were no significant findings for the correlation between General Anxiety and the Mastery Approach from The Modified Patterns of Adaptive Learning Scales, but there was a moderate correlation between Reading Mastery Approach and Math Mastery Approach ($r_s = .461$, $n = 42$, $p = .002$), suggesting in Approach in Reading extends and is correlated with Approach in Math in Adaptive Learning.

The present study demonstrates a correlation between Mastery Approach and Mastery Avoidance from The Modified Patterns of Adaptive Learning Scales. This is supported by a strong significant correlation between Math Mastery Approach and Math Mastery Avoidance ($r_s = .548$, $n = 44$, $p < .001$). The correlation between Mastery Approach and Mastery Avoidance is also demonstrated by a moderate correlation between Math Mastery Approach and Reading Mastery Avoidance ($r_s = .470$, $n = 42$, $p = .002$). The findings also support a correlation between Mastery Approach and Mastery Avoidance with a low correlation between Reading Mastery Approach and Reading Mastery Avoidance ($r_s = .298$, $n = 46$, $p = .044$).

Discussion

The current study jointly posits that, among students with reading difficulty and both math and reading difficulties, 1) the specific domain of Reading Anxiety correlates with General Anxiety and 2) General Anxiety has a correlation with Adaptive learning, specifically Mastery Avoidance.

Looking at the expansion of reading anxiety to generalized anxiety, we found significant correlations between anxiety in reading and general anxiety. These findings support the hypothesis children who have a reading disability or children who have a comorbid reading disability and math disability reading anxiety expands to generalized anxiety. The findings from this study are congruent with previous findings suggesting children with learning disabilities who experience higher anxiety levels in reading and math performance also tend to have higher generalized anxiety levels. In the quadrant, the two categories that demonstrate reading anxiety expands to general anxiety for the majority of people with only Reading Disabilities and those with comorbid Reading and Math Disabilities are: 1) high reading anxiety having a relationship with high general anxiety (58.33%) and 2) low reading anxiety having a relationship with low

general anxiety (25%). A possible theoretical explanation for these findings is that domain-specific anxieties, such as reading anxiety or comorbid reading and math anxiety, impact performance which have greater effects on self-esteem, perceived competence, motivation to learn more in those subjects, sense of fulfillment, etc. which expands to generalized anxiety since these are attributes that are outside of the specific domain the anxiety stems from.

The findings also supported our hypothesis that there is a correlation between General Anxiety and Mastery Avoidance from The Modified Patterns of Adaptive Learning Scales. This was supported by a moderate correlation between General Anxiety and Reading Mastery Avoidance and a significant moderate correlation between General Anxiety and Math Mastery Avoidance, suggesting the Mastery Avoidance component of Adaptive Learning in Reading, as well as Math, is correlated with General Anxiety. A possible theoretical explanation for these findings is that avoidance serves as a maladaptive behavioral response to anxiety or fears. A future direction to further elucidate this concept could be to analyze levels of General Anxiety and determine if there is a threshold that correlates with Mastery Avoidance in The Modified Patterns of Adaptive Learning Scales.

A number of limitations in this study should be considered. The first of which is the small sample size ($N= 51$) which could poorly represent children with reading disabilities and comorbid reading and math disabilities. If the sample were larger the findings could have been better generalized given the gender split of the study which was primarily males (31 males, 21 females). Second, the self-report nature of the anxiety measures might artificially inflate relationships among variables. Similarly, while the average age of participants was young, $M= 104.38$ months with $SD= 8.076$, males could have underreported anxiety levels due to social pressure from peers during the administration of anxiety questionnaires that made them less

likely to self-report anxiety. The participants responded to questions in a group setting that could have prompted biased responses to meet social norms in the group self-report situation.

Similarly, the stress of learning anxiety-inducing topics during the reading intervention program where this data was drawn could have also influenced the results of the questionnaires rather than if they were completed during a time not near completion of math or reading work.

Future directions to further analyze inquiries of domain-specific anxiety generalizing could include more anxiety measures and expand the academic anxiety to math performance by including more math anxiety questionnaires. Analysis of gender and the generalization from reading and math anxiety to generalized anxiety could also serve as a future direction.

Ultimately, the strengths of this study include its ability to present the performance abilities of children with reading and math difficulties as well as their self-reported anxiety levels. The broader implications of the study findings include identifying intervention targets (Grills et al., 2013) for children with reading difficulties or children with overlapping reading and math difficulties given the link of reading anxiety to general anxiety and academic achievement. The implications of this can further extend to identifying individuals with excessive avoidance in reading and math since undue anxiety is a feature of many emotional disorders (Barlow, 2002) which can extend to Generalized Anxiety.

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Appendix A**BASC-2**

The following are the 13 questions presented to participants in the BASC-2. 11 of the questions were presented in a four-point Likert-type scale (1 = never; 5 = always) questions and 2 were presented as true/false questions.

1. I worry about little things (T/F)
2. I often worry about something bad happening to me. (T/F)
3. I am bothered by thoughts about death.
4. I am afraid I might do something bad.
5. I get nervous.
6. I am bothered by not getting enough sleep.
7. I am afraid of a lot of things.
8. Little things bother me.
9. I worry but I don't know why.
10. I worry when I go to bed at night.
11. I get so nervous I can't breathe.
12. I worry about what is going to happen.
13. I get nervous when things do not go the right way for me.

Appendix B

Reading Anxiety Questionnaire

The following are the 19 questions presented to participants in the Reading Anxiety Questionnaire, with one filler question (#9) to ensure participants were paying attention. For each question, participants selected one answer choice from the four-point Likert-type scale (1 = never; 5 = almost always).

1. When I have to read out loud in front of others, my heart races.
2. I often try to avoid situations when I know I will have to read.
3. Looking at long paragraphs of text or thick books fills me with dread.
4. I feel sweaty and hot when I have to read something with a time limit.
5. I am happy when I have time to read.
6. I feel sick when I know I have to read.
7. My mind goes blank when I have to answer questions out loud about what I just read.
8. I act silly to try to get out of reading.
9. Please select "Sometimes" for this question.
10. I get butterflies in my stomach when I have to do reading tests.
11. When I have to read words that are too hard, I shut down.
12. I choose to read when given a choice.
13. Reading things with small font and no pictures gives me a headache.
14. I feel fear when I know I have to read out loud in front of others.
15. I pretend to be sick so I don't have to do reading homework.
16. When I read, I feel relaxed.

17. I worry that other people will make fun of my reading.
18. When I have to read words that I have never seen before, I feel like I want to escape.
19. When I read to another student, I get nervous I will mess up the words.

Appendix C

Modified Patterns of Adaptive Learning Scales Reading

The following are the 6 Mastery-approach goal questions and the 6 Mastery-avoidance goal questions presented to participants in the Modified Patterns of Adaptive Learning Scales Reading. Participants selected choices from a five-point Likert-type scale (1 = never; 5 = always true).

Mastery-approach goal

1. I like reading activities that I'll learn from, even if I make a lot of mistakes.
2. An important reason I do my reading work is because I like to learn new things.
3. I like reading work best when it really makes me think.
4. An important reason why I do my reading work is because I want to get better at it.
5. I do my reading work because I'm interested in it.
6. I do my work in reading because I want to learn as much as possible.

Mastery-avoidance goal

18. I'm afraid that I won't do my very best in my reading class.
19. I'm concerned that I may not learn all there is to learn from my reading class.
20. I'm afraid that I may not understand the lessons in my reading class as completely as I should.
21. It is important to me "not" to do my reading work incorrectly.
22. I worry that I may not learn all that I possibly could in reading.
23. It is important to me to avoid the possibility of not learning in my reading class.

Appendix D

Modified Patterns of Adaptive Learning Scales

The following are the 6 Mastery-approach goal questions and the 6 Mastery-avoidance goal questions presented to participants in the Modified Patterns of Adaptive Learning Scales Math. Participants selected choices from a five-point Likert-type scale (1 = never; 5 = always true).

Mastery-approach goal

1. I like math work that I'll learn from, even if I make a lot of mistakes.
2. An important reason I do my math work is because I like to learn new things.
3. I like math work best when it really makes me think.
4. An important reason why I do my math work is because I want to get better at it.
5. I do my math work because I'm interested in it.
6. I do my work in math because I want to learn as much as possible.

Mastery-avoidance goal

18. I'm afraid that I won't do my very best in my math class.
19. I'm concerned that I may not learn all there is to learn from my math class.
20. I'm afraid that I may not understand the lessons in my math class as completely as I should.
21. It is important to me "not" to do my math work incorrectly.
22. I worry that I may not learn all that I possibly could in math.
23. It is important to me to avoid the possibility of not learning in my math class.