Reading difficulty and socio-emotional adjustment: Internalizing patterns depend on age of identification

Alyse Sukovieff and Richard S. Kruk

Abstract: Children with reading difficulty experience stress in school that may put them at risk of negative socio-emotional adjustment involving externalizing or internalizing patterns. It is unclear what factors influence some children to experience externalizing patterns and others internalizing patterns. This study investigated the influences of the age of identification of reading difficulties and coping strategies on socio-emotional adjustment. Data were collected from 31 children with reading difficulty (ages 9 to 12 years), recruited from Winnipeg schools and child-care centres, on measures of coping strategy and socio-emotional adjustment and parent/guardian reported age-of-identification. Direct and indirect process analyses, using percentile bootstrapping, were used to examine mediating effects of coping strategies in the relationship between age-of-identification and socio-emotional adjustment. Results showed late-identified children (in Grade 2 or later) were more likely to report using disengagement coping strategies. Early-identified children (before Grade 2) were more likely to report higher internalizing patterns. Evidence for partial mediation by secondary coping strategy on the relationship between age-of-identification and internalizing outcomes was found. No other mediation patterns were found, including indirect effects of age-of-identification on...
socio-emotional functioning through coping. Although early identification of reading difficulties is associated with greater risk of developing internalizing problems, patterns of coping with reading-related stress have limited influence. Clarifying how age of identification of reading difficulty influences socio-emotional adjustment will help resolve theoretical debates about the experience of reading difficulty as a risk factor for negative socio-emotional adjustment, and will help educators/clinicians to promote struggling readers’ healthy socio-emotional adjustment.

Subjects: Dyslexia; Emotional & Behavioural Difficulties; School Psychology; Educational Psychology

Keywords: reading difficulty; socio-emotional adjustment; age of identification; internalizing

Children with persisting reading difficulties experience school-related stresses that can lead to negative socio-emotional development including externalizing (e.g., frustration/anger) and internalizing (e.g., shame/anxiety) patterns (Boyes et al., 2016; Dohle & Knivsberg, 2013; Kempe et al., 2011; Undheim & Sund, 2008). In a large study of children aged 5 to 15 years, difficulties with reading were associated with emotional and behavioural difficulties, including symptoms of ADHD and anxiety (Carroll et al., 2005). Children who experience externalizing or internalizing patterns are at risk of future negative outcomes that include dropping out of school, developing behavioural problems, and experiencing suicide ideation (Fernandez Castelao & Kröner-Herwig, 2014; Liu et al., 2011). The DSM-5 supports the grouping of disorders into internalizing and externalizing categories for both clinical and research assessment, highlighting that externalizing patterns show aggressive behaviours while internalizing patterns show sadness and anxiety (Achenbach et al., 2016). While children are more likely to demonstrate externalizing behaviours at a younger age, and then grow out of these and replace them with internalizing behaviours, there is also substantial research demonstrating that a variety of experiences, stressors, and social variables are related to differential trajectories of internalizing and externalizing problems, alone or co-occurring (Fanti & Henrich, 2010). The relationship between reading difficulties and socio-emotional adjustment is not well understood; reading difficulties can lead to negative emotions ranging from anger (externalizing) to anxiety (internalizing), but it is not clear why some children demonstrate one type of negative emotion or another when struggling to read.

The quality of socio-emotional functioning of children could potentially depend on the age at which reading difficulties are identified. This study aimed to explore the relationship between age of identification of reading inefficiency and socio-emotional outcomes, and whether strategies that children report using to cope with reading-related stress mediate this relationship. Drawing on social-information processing theory (Crick & Dodge, 1994), which posits that children’s reactions to social situations become engrained and resistant to change, we propose that when children are identified as having inefficient reading skills their reaction to this stress becomes habitual at their developmental stage of coping when they first experience the stress. Understanding more about socio-emotional development of children who struggle with reading will allow educators, school counselors, and clinicians to better meet the needs of these children.

1. Children with early reading difficulties show later externalizing patterns

Reading difficulties are often associated with externalizing patterns, particularly in children identified with reading difficulties at a young age. Externalizing patterns involve impulsive, disruptive, and conduct-related behaviours (Achenbach et al., 2016). Kindergarten children with persisting reading difficulties in Grades 1, 2, and 3 are more likely to experience inattention, hyperactivity, and aggression than typical readers (Kempe et al., 2011). Grade 1 children in the lowest 10% of reading ability are more likely than the remaining 90% to display poor task-engagement, poor self-control, externalizing problems, and behaviour difficulties in Grade 3 (Morgan et al., 2008).
Interestingly, early problem behaviours (except for inattention) do not predict reading difficulties in Grade 3. This is consistent with the idea that reading difficulties can lead to later development of negative socio-emotional adjustment, but that early problem behaviours do not predict later difficulties in reading.

Morgan and Farkas (2009) examined the role of early reading ability in predicting negative socio-emotional patterns after controlling for initial internalizing and externalizing patterns. Kindergarten children who were among the lowest 15% of reading (the poorest readers), the highest 15% of internalizing, or the highest 15% of externalizing problems (experiencing the most severe internalizing or externalizing problems respectively) were selected to examine how the occurrence of either reading or behaviour problems influence later school outcomes. Kindergarten children with low reading readiness (in the lowest 15% of reading) were more likely to show externalizing symptoms later in Grades 3 and 5 compared to the strong-reading group even after controlling for Kindergarten level of externalizing characteristics. This was not found for internalizing outcomes—low reading levels at Kindergarten did not predict internalizing patterns in Grades 3 or 5 (Morgan & Farkas, 2009). These findings indicate that young children with reading difficulties may be at risk of later externalizing symptoms but not necessarily internalizing symptoms. This suggests that reading stressors may be among the variables related to differing developmental trends of externalizing or internalizing difficulties (Fanti & Henrich, 2010).

2. Older children with reading difficulties show either internalizing or externalizing patterns

Older children with reading difficulties show elevated internalizing and externalizing symptoms. Willcutt and Pennington (2000) found that 10-year-old poor readers were more likely than typical readers to show either externalizing or internalizing patterns. This contrasts with Morgan and Farkas (2009), who showed that younger poor readers exhibited only externalizing patterns; Willcutt et al.’s older sample showed both externalizing and internalizing patterns.

Furthermore, Undheim and Sund (2008) found that self-identified 12—15-year-old poor readers were more likely than good readers to experience symptoms of depression, increased school stress, and have more worries about going to school (all internalizing patterns). One year later, those with persisting reading difficulties showed higher rates of both internalizing and externalizing problems (Undheim et al., 2011), consistent with Willcutt et al.’s findings. Leeuwis et al. (2015) found that children with high self-expectations but low general academic performance were more likely to show internalizing concerns.

Similarly, children with poor reading in the spring of their Grade 3 year, at about eight years of age, demonstrated both elevated externalizing and internalizing patterns with equal frequency in the spring of Grades 3 and 5, at about 10 years of age (Morgan et al., 2012). Morgan et al. (2012) examined children’s self-reports of internalizing and externalizing symptoms as well as self-reports of their abilities to make friends. Children who fell within the lowest 10% of reading ability in late Grade 3 were more likely to endorse internalizing-type symptoms like “sad”, “angry”, and “unpopular” in Grade 5, compared to typical readers (Morgan et al., 2012). The predictive association between Grade 3 reading ability and Grade 5 socio-emotional outcome remained significant even after controlling for initial internalizing and externalizing patterns and other demographic factors associated with these behaviours (Morgan et al., 2012). The authors concluded that children with poor reading ability are at higher risk of expressing anger, sadness and other internalizing or externalizing symptoms, particularly without adequate interventions to ameliorate these risks.

The above literature indicates that young children with reading difficulties are more likely to display later externalizing patterns only, but that older children with reading difficulties are susceptible to both externalizing and internalizing patterns. Children with reading difficulty in both age groups are more likely than their typically reading peers to display poor socio-emotional adjustment, but there appears to be a difference in the type of outcome depending
on the age of the student when first identified with reading difficulty. The difference in the type of outcome may be a function of the age at which children’s reading difficulties were identified. All children with reading difficulty in Morgan and colleagues’ work had a higher likelihood to display socio-emotional difficulties and to develop further reading difficulties, but the age at which their children’s reading difficulties were detected was different across studies (Kindergarten, about age five years, in Morgan & Farkas, 2009, showing externalizing patterns, and Grade 3, about eight years, in; Morgan et al., 2012, showing internalizing and externalizing). Morgan et al. (2012) did not investigate whether children who had demonstrated reading difficulties prior to Grade 3–5 showed different socioemotional patterns than those who were recently identified within the Grade 3–5 range. Students report that being identified with a learning difficulty in school can be distressing (Frankel & Brooks, 2018; Ginsberg, 2020). It may be that early identification and persistence of reading difficulty is associated with the experience of persisting reading-related stress. This potentially could magnify negative socio-emotional outcomes, in comparison with the experience of later-identified children, who presumably experience reading-related stress over a shorter time frame. This difference in duration of reading-related stress could have a differential influence on emerging socioemotional characteristics. Hence, in the current study we explore the possibility that the difference in socio-emotional adjustment outcome is related to the age at which reading difficulties are identified. We focus on age of identification as a circumstance that could influence the likelihood that children with reading difficulty experience internalizing or externalizing patterns.

3. Age of identification of poor reading
Reading difficulties emerge and are identified at different ages. Reading difficulties that are identified at later grades may include difficulties with decoding larger words, efficient decoding, or comprehending the text following decoding (Catts et al., 2012). Importantly, difficulties with efficiently decoding words can have a negative impact on comprehension as too much cognitive capacity may be allocated to the correct decoding rather than to understanding the meaning of the text. For the purposes of this study, we focus on children who demonstrate difficulties in decoding and decoding efficiency. It is likely that some could experience reading comprehension difficulties as a function of poor decoding efficiency, as delineated in the simple view of reading that conceptualizes reading comprehension as a product of word decoding and language comprehension (Fletcher et al., 2019; Hoover & Gough, 1990). However, we do not consider children with specific reading comprehension difficulty who have typical decoding ability. Catts et al. (2012) found that children in Grades 2 (at about seven years of age) through 10 (at about 15 years of age), with late-identified reading disabilities, accounted for 42% of poor readers across grades. In addition, the characteristics of reading difficulties for late-identified struggling readers might be distinct from those of children identified early (Leach et al., 2003). Factors that camouflage a child’s difficulties may allow for a child to feel less stress in struggling with learning to read even though the difficulties had already originated; however, upon identification, reading-related stress may increase. Hence, studying the time-course and consequences of persisting reading difficulty may show different socioemotional patterns as a function of age of identification and associated persistence of reading-related stress.

4. Age of identification, coping and socio-emotional adjustment
The age at which children are identified with reading difficulties may be important in determining children’s coping skills and socio-emotional outcomes. Using coping skills (patterns of thinking or behaving intended to change the stressor or the way that the stressor is perceived by the individual) can reduce emotional discomfort brought on by stress (Rothbaum et al., 1982). Coping skills change with learning and development (Skinner & Zimmer-Gembeck, 2007).

People use various coping strategies including primary, secondary, and disengagement types (Babb et al., 2010; Compas et al., 2001; Rothbaum et al., 1982). Primary strategies involve attempts to change the environment producing the stressor (e.g., switch tasks from the stressful activity to an enjoyable one). Secondary strategies involve changing the perception of the stressor (e.g., accepting
the stressor as a part of life and being comfortable with this) (Rothbaum et al., 1982). Disengagement strategies constitute withdrawing from the stressor (e.g., denying the problem exists or emotional numbing). Coping strategies can be adaptive or maladaptive, depending on the degree to which the person experiencing stress is able to change the environment producing the stressor; secondary coping, for example, can be protective against internalizing patterns (Compas et al., 2001).

Babb et al., (2010) demonstrated that primary coping strategies are learned before secondary coping strategies. Primary coping strategies can involve behaviour that is intrusive to others in attempting to change the stressful environment. Frustration, anger and exhaustion can occur with persistent use of primary coping strategies in uncontrollable environments or situations (Babb et al., 2010). Classroom activities are generally not chosen and are uncontrollable by children; hence, primary coping strategies would be maladaptive for a child during a stressful classroom activity like reading. A child with reading difficulty who uses primary coping strategies (such as attempting to redirect classroom activity to something other than reading during reading activities) may experience a reprimand (a maladaptive outcome) rather than support (an adaptive outcome).

In situations in which the person feeling stress has little control over the stressor, using secondary coping is more likely to lead to an adaptive outcome in reducing stress (Babb et al. 2010). Secondary coping strategies aim to reduce stress by changing one’s perception of a situation that is considered stressful and uncontrollable (Babb et al., 2010). It is uncertain when secondary coping strategies are first used in childhood. However, estimates of first use range from 5 to 11 years; Babb et al. (2010) suggest that children do not begin using secondary coping strategies until age seven or eight.

Although secondary coping can be helpful in reducing stress, these strategies can also lead to negative outcomes when used incorrectly. If a child is stressed by reading failure and uses a secondary coping strategy of acceptance, he or she may accept reading difficulty as an unavoidable, permanent part of life and discontinue effort to learn to read. Although the child may not feel the same level of stress, he or she will not likely learn to read without sustaining effort towards this task (a maladaptive outcome in schools in which reading is a necessity).

Both disengagement and secondary coping strategies involve reducing effort towards a task. Disengagement coping reduces this effort through avoidance. A child using disengagement coping when struggling with reading (e.g., denying difficulties with reading) may not engage in the more-intensive practice reading that is needed to learn to read (a maladaptive outcome).

Avoidance and reduced effort can lead to negative outcomes for children learning to read; without practice children could continue to struggle and begin to anticipate failure. Struggles with reading combined with use of maladaptive secondary coping or disengagement strategies can lead to continued struggles with reading because of reduced opportunities to develop reading skill. Self-identified poor readers are less likely to seek help than typical readers (Undheim & Sund, 2008). Not seeking help in reading, combined with self-identifying as a poor reader, are two passive behaviours that reflect maladaptive use of secondary coping strategies. Avoidance that accompanies maladaptive secondary coping or disengagement coping can negatively affect self-esteem and emotional responses. Performance-avoidant attitudes that accompany these coping styles are positively correlated with anxiety and depression in Grade 5 and 6 students (Sideridis, 2005), particularly for depression related to academic performance and to social self-esteem. Children who hold performance-avoidance goal orientations, such as preferences to not be graded, have elevated scores on items indicating negative social self-esteem and negative affect (Sideridis, 2005), all of which also indicate negative side effects of using secondary coping in dealing with classroom-based stressors related to achievement.

Because secondary coping and disengagement coping strategies are unlikely to be available as part of very-young children’s repertoire of coping skills, children who experience the stress of
reading difficulty in early school years may rely heavily on primary coping strategies (in attempting to re-direct classroom activity). In contrast, children who do not experience the stress of classroom-identified reading failure until later years may use new and more-developed coping skills (such as acceptance or denial) to reduce reading-related stress, favoring secondary or disengagement rather than primary strategies.

Initial coping strategies of children with reading difficulties identified at an early age likely involve primary coping. These children may continue to habitually use primary coping strategies to deal with persistent reading difficulty and stress. The persistent use of primary strategies in early-identified struggling readers can be conceptualized within a social-information processing framework (Crick & Dodge, 1994). Accordingly, children learn patterns of assessing and reacting to social situations at an early age; these reactions become habitual and resistant to change as they are practiced over time. It is more efficient for the child to rely on such learned patterns of behaviour even if a different reaction may produce better outcomes (Crick & Dodge, 1994). Extending this to use of coping strategies, children at early ages may become familiar and resistant to change in preferred coping strategy use for a given stressor over time if the stressor persists. Therefore, early-identified poor readers are likely to continue to use primary coping with continued reading struggles. Later-identified children, who would have experienced reading stress more-acutely at older ages, may prefer to use later-learned and more-effective secondary coping strategies instead of primary strategies. Children who begin to experience the stress of identified reading difficulties at a later age are not likely to have habituated using primary coping for that particular stressor.

4.1. Current study
Given the emerging evidence that the socio-emotional development risks faced by children with reading difficulty might differ depending on the age of identification, this study aimed to explore questions about the relationship between age-of-identification and socio-emotional outcomes. First, how does the age at which children are identified with inefficient reading influence their later socio-emotional development of externalizing or internalizing patterns? Second, does the preferred coping strategy of children with poor reading mediate the relationship between age-of-identification and socio-emotional outcome?

4.1.1. Hypotheses
First, early-identified children (poor reading identified in Grade 1—six years of age or earlier) were expected to show heightened externalizing patterns in later elementary years. In these children, the experience of reading-related stress in school begins when children had not yet acquired secondary coping strategies and are assumed to have relied on primary coping strategies to deal with stress. Consistent with social information-processing theory, at later ages these children with persisting early-identified poor reading are assumed to habitually use primary coping skills for reading-related stress, contributing to displays of externalizing rather than internalizing patterns. Preference for primary coping strategies was predicted to partially mediate the relationship between age-of-identification and externalizing patterns, and explain the relationship between age of identification and externalizing.

Second, late-identified children (reading difficulties identified in Grades 2 to 5, from ages seven to 12 years) were expected to show heightened internalizing patterns in later elementary years. In these children, the experience of reading-related stress in school begins at a later point at which children would have acquired secondary coping skills. Late-identified children were expected to show internalizing patterns as a function of preference for maladaptive secondary coping strategies or disengagement coping strategies when dealing with reading-related stress. Hence, the preference for secondary/disengagement coping strategies for reading-related stress was predicted to partially mediate the relationship between age-of-identification and internalizing patterns. We expect that the addition of preference for each coping strategy in the statistical models
will account for significant variance in the association between age-of-identification and internalizing, resulting in a weaker association.

5. Method

5.1. Participants

Forty-five children (ages 9 to 12 years) with reading difficulty were recruited from schools and child-care centres in Winnipeg, Canada. Children were initially identified through teacher or parent/guardian nomination, and efficiency in decoding was measured. This allowed us to establish children's persisting difficulties in reading fluency. All children had normal/corrected to normal vision. Twenty-four children participated at schools and 21 at a university lab, community-based locations, or child-care centres during evenings and weekends. Parents/guardians of children provided informed consent and completed a parent questionnaire. Parents/guardians of 14 participants reported that their child received help for reading outside of school; one did not indicate whether help outside of school was received. Twenty-eight participants’ parents/guardians reported that their child received help for reading in school; two did not indicate whether their child received help in school. Of the initial sample of children, 14 could not be included in the data analysis for reasons detailed below, giving a final sample of 31 children.

Children were excluded if demographic information indicated that the child was not fluent in English, or if the child's IQ score was below 70 (two or more standard deviations below the population average). One had low English fluency and one had low IQ. These criteria ensured that differences between age-of-identification groups on coping strategy preference and socio-emotional characteristics were not due to lack of understanding English or low cognitive ability. In addition, seven parents/guardians did not indicate the grade at which the child began to struggle with reading; these cases were excluded from the data analysis. Finally, five children scored higher than average on the reading measure and were excluded on the basis of not having a verified reading difficulty.

5.2. Materials

Children were measured on reading ability using the Test Of Word Reading Efficiency-2 (TOWRE-2, Torgesen et al., 2012), self-reported coping strategy preference for reading-related stress using a modified version of the Response to Stress Questionnaire—School (RSQ; Compas et al., 2001; see Appendix A), self-reported socio-emotional adjustment using a modified version of the Self-Description Questionnaire (SDQ; National Center for Educational Statistics, 2002; available from http://nces.ed.gov/ecls/pdf/thirdgrade/childselfdescription.pdf; see Appendix B), and intelligence using a composite of the vocabulary and matrix reasoning subsets of Wechsler Abbreviated Scale of Intelligence, Second Edition (WASI-2; Wechsler, 2011). Parents/guardians completed a demographic questionnaire (see Appendix C) for information about children's family background and reading history to provide information about the grade at which their child's reading difficulties began, English-language proficiency, and SES.

5.2.1. Reading ability

The TOWRE-2 measures reading efficiency of words and pronounceable nonwords, allowing us to establish enduring reading problems related to individual-item fluency. Poor fluency reflects problems in basic reading skills, and can impact comprehension in older poor readers whose comprehension difficulties are a function of poor decoding efficiency and not spoken language difficulties (Bishop et al., 2009; Fletcher et al., 2019; National Reading Panel (U.S.), 2000). Children read two lists of items, words and pronounceable nonwords, out loud as quickly and accurately as possible. Standardized composite scores were used; scores less than 90 indicate below-average single-item decoding fluency, a skill that is “particularly diagnostic of early or basic difficulties in learning to read” (Torgesen et al., 2012, p. 2). Norm-sample reliability coefficients range from 0.87 to 0.95 (Torgesen et al., 2012).
5.2.2. Response to stress
An adaptation of the RSQ-school version was used to measure children’s preferred coping strategies for stresses in academic environments. The adaptation involved changing the wording of items to direct children’s attention to reading experiences. Test-derived factors used in the present study included primary coping strategies, secondary (adaptive) coping strategies, and disengagement (maladaptive) coping strategies, as proportions of overall coping strategies used. In addition, a measure of degree of stress experienced related to reading was included (Compas et al., 2001; Connor-Smith et al., 2000).

The RSQ proportion scores are based on the ratio of number-and-weighting of items endorsed for a given coping strategy compared to the endorsed total (Connor-Smith et al., 2000). Children’s degree of use of each coping strategy of interest (primary, secondary, and disengagement, in addition to other strategies) was measured to determine the extent to which each influences socio-emotional adjustment outcomes.

5.2.3. Socio-emotional adjustment: externalizing and internalizing patterns
The SDQ, a self-report scale modified from Marsh (1990) by the National Center for Education Statistics (2002) for the Early Childhood Longitudinal Study (Pollock et al., 2005a; 2005b), was chosen because it was used in previous research on socio-emotional outcomes in children with reading difficulty (Morgan & Forkas, 2009; Morgan et al., 2012). Like the RSQ, the SDQ uses proportional scores based on ratios of frequency of endorsing eight internalizing items (3, 7, 14, 20, 25, 29, 32, and 40) and six externalizing items (5, 9, 17, 23, 34, and 37) respectively, the total number of items endorsed, and the strength of the endorsement. The SDQ asks how “true” an item is for a child using a four-point Likert scale. The SDQ internalizing and externalizing scales have strong psychometric and theoretical properties (Gable, 1998; Morgan et al., 2012; Pollock et al., 2005a; 2005b).

5.2.4. Intelligence
The vocabulary and matrix reasoning subtests of the WASI-2 were used to obtain composite IQ estimates to ensure that children in the study had cognitive abilities within the average range (not more than two standard deviations below the population mean). Standard administration procedures were followed. The vocabulary subtest, involving children providing definitions for words in English, is an index of verbal intelligence, and the matrix reasoning subtest, involving selecting visual pattern segments to complete larger visual patterns, measures nonverbal intelligence. Together, these subtests provide a quick estimate of IQ with good reliability; coefficients range from 0.87 to 0.97 (Wechsler, 2011). Standard scores from this composite measure were used for the exclusion criterion (IQ < 70) to ensure that results were not influenced by low cognitive abilities.

5.2.5. Demographic measures
Parents’ responses to questions on family demographic factors (e.g., parent education and income levels provided a measure of SES risk—“low risk” was indicated by high education, with “more than high school” endorsed by at least one parent, and high family income, more than $50,000 CAD, the local low-income cut-off, whereas “high risk” was indicated by low education, low family income, or both) were examined in correlation analyses. Any significant correlations between these factors and age-of-identification, coping strategies, and socio-emotional outcomes were flagged for use as control variables in the mediation analyses. Parents were also asked about the child’s history of reading difficulty—specifically what grade their child began to demonstrate poor reading. Parents were asked both when they first noticed their child struggling with reading and when the school first recognized their child’s reading difficulties. The earlier of the two grade indications was used as the age-of-identification of the child’s reading difficulties.

Finally, parents were asked if their child had received any help from school resources or from external resources to improve their reading skills. Additional support for a child’s reading may have
a significant impact on attitudes towards and perceptions of reading and school, as well as on socio-emotional development.

5.3. Procedure
Teachers in participating public schools nominated “poor readers”—defined as any child having difficulty reading as evidenced by decoding or comprehension difficulties on classroom-based measures and experiences. Individuals who participated in university-lab or community locations were self-reported poor readers. Parents/guardians were given a package with a description of the study, consent form, and the demographic questionnaire. Parents/guardians were asked to return completed forms to the children’s classroom teachers; parents returned forms directly to the researcher when participating at the university or community location. All testing was completed during the final half of the elementary school year from January to June.

Children in schools were taken to a quiet room in the school to complete the study. Participants were informed that they were not being graded, that answers they provided were confidential, and that they were free to withdraw at any time. Children provided verbal assent.

Participants completed the tasks individually during 50-minute sessions. Children completed the RSQ and SDQ with one researcher, and the WASI subtests and TOWRE-2 with another. The order of administration of these groups of tests was counterbalanced across children. Graduate and honours psychology students administered assessments, and assistance was given with reading of rating-scale questions (RSQ and SDQ) when requested by children; no help was given in choosing answers. The reading levels of the items might have been higher than some children’s reading abilities; hence the provision of assistance. Researchers thanked children for participating, with debriefing information and child (pencils, erasers, and stickers), and parent compensation ($5.00 gift card). Teachers were given books for their classrooms at the end of the study.

5.4. Data preparation
Data entry and analysis were done using SPSS v. 25. Mediation analyses was conducted using the PROCESS macro (Hayes, 2018).

Age of Identification was coded 0 for early-identified struggling readers and 1 for late-identified struggling readers. Treating these data as dichotomous rather than continuous helped to address potential imprecision in parents’ estimates. Early-identified struggling readers were children whose reading difficulties were identified in Grade 1 or earlier and late-identified struggling readers were those whose difficulties were identified in Grade 2 or later. Winnipeg children entering Grade 2 are usually age 7, the age at which Babb et al. (2010) suggested that children begin to use other coping skills beyond primary strategies. Thus, defining the groups at this grade was assumed to establish groups of children who at the age of identification had access to multiple coping strategies (Grade 2 and later) and those with access to mainly primary coping skills (Grade 1 and earlier).

6. Results
We report descriptive statistics, including age-of-identification group characteristics, and correlations, followed by outcomes of mediation analyses. Age-of-identification, a dichotomous variable, was analyzed using non-parametric methods.

6.1. Descriptive statistics and age-of-identification group differences
Group frequencies are given in Table 1, and means and standard errors on test measures are given in Table 2. Seventeen children were in the early-identified group and 14 children were in the late-identified group (seven identified in Grade 2, four in Grade 3, and three in Grade 5).

Because the RSQ was altered to focus on children’s reading-specific stress responses, a measure of reliability using split-half correlation on scores from the study sample was used, indicating good
reliability (Spearman-Brown coefficient = 0.90). The self-reported perceived reading-related stress was the average of ratings of items a. through g. on the RSQ (see Appendix A). All children endorsed at least one item as 2.00 ("a little") or above. The overall sample mean rating on all stress-related items was 2.30, indicating some reading-related stress. This overall rating was significantly higher than the rating of 2.00 ($p < .004$), and there were no group differences in average stress score (see Table 2). A significant group difference on RSQ disengagement coping indicated late-identified children scored higher, consistent with expectations. On the SDQ, with a sample-based split-half

| Table 1. Age-of-identification group demographics (frequencies) |
|---------------------------------------------------------------|
| **Age-of-Identification Group**                               |
| Early Identified | Late Identified |
| N | 17 | 14 |
| Female | 6 | 9 |
| Age-At-Testing (years) | | |
| 9 | 1 | 1 |
| 10 | 6 | 6 |
| 11 | 9 | 6 |
| 12 | 1 | 1 |
| Reading Intervention | | |
| In-School | 14 | 12 |
| Out-of-School | 10 | 3 |

| Table 2. Age-of-identification group mean scores (SE) on reading, cognitive, coping, and socio-emotional measures |
|------------------------------------------------------------------------------------------------------------------|
| **Age-of-Identification Group**                                                                                  |
| Measure | Early Identified | Late Identified | $p$ |
| TOWRE-2$^a$ | 74.12 (3.09) | 76.93 (3.22) | ns |
| WASI-2$^a$ | 92.47 (3.18) | 83.93 (2.07) | * |
| RSQ Mean Stress$^b$ | 2.34 (0.18) | 2.29 (0.21) | ns |
| RSQ Coping Ratios $^c$ | | | |
| Primary | 0.17 (0.01) | 0.16 (0.01) | ns |
| Secondary | 0.23 (0.01) | 0.25 (0.02) | ns |
| Disengagement | 0.14 (0.004) | 0.17 (0.01) | ** |
| Involuntary Engagement | 0.26 (0.01) | 0.24 (0.01) | ns |
| Involuntary Disengagement | 0.20 (0.01) | 0.19 (0.01) | ns |
| SDQ$^b$ | | | |
| Externalizing | 2.51 (0.10) | 2.15 (0.14) | * |
| Internalizing | 2.63 (0.11) | 2.13 (0.14) | ** |

Note. a. Standard scores, with population mean 100 and standard deviation 15. b. Mean rating on a 1 to 4 point scale. c. Proportion of total rating across coping strategies. TOWRE-2: Test of Word Reading Efficiency, second edition; WASI-2: Wechsler Abbreviated Scale of Intelligence, second edition; RSQ: Responses to Stress Questionnaire (modified); SDQ: Self-Description Questionnaire.

* $p < .05$; ** $p < .01$; ns not significant.
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Spearman-Brown reliability of .95, the early-identified group scored higher than the late-identified group on externalizing, consistent with expectations, but also on internalizing, contrary to expectations.

Groups did not differ on reading ability (p = .54), indicating good matching on this characteristic. However, the late-identified group had lower IQ than the early-identified group, though members of each group achieved our IQ-threshold for involvement. The minimum sample IQ score was 72 and the maximum was 115. Because groups did not differ on the reading measure, and IQ did not correlate with any test measures, we did not include IQ in subsequent analyses. The groups' mean TOWRE-2 composite standard scores fell below the “Below Average” range: 74.12 (SE = 3.09) and 76.93 (SE = 3.22) for early and late-identified groups respectively, with scores ranging from 53 to 95 points. The “Below Average” range of the TOWRE-2 includes scores from 80 to 89.

6.1.1. Spearman correlations
The non-parametric Spearman correlations involving age-of-identification are given in Table 3. The significant positive correlation between age-of-identification and proportion use of disengagement coping indicates that late-identified children were more likely than early-identified children to use this coping style. Age-of-identification and self-reported externalizing and internalizing patterns were negatively related, indicating that early-identified children were more likely than late-identified children to report more externalizing and internalizing patterns on the SDQ.

Participants with Low SES-risk were more likely to receive help for reading outside of school. There were no other significant correlations with this SES variable; hence, SES-risk was not included in further inferential analyses. In addition, distribution of Low and High SES-risk was not significantly different between early and late identified groups (χ² = 2.78, p = .096). Finally, children who rated themselves with higher levels of stress on the RSQ were less likely to receive help for reading outside of school.

6.1.2. Pearson correlations
Pearson correlations among variables included in the mediation analyses are given in Table 3. Children’s chronological ages were not significantly correlated with any variables. As noted earlier, TOWRE-2 and IQ scores were not correlated with the variables included in the mediation analyses. However, a negative relationship was found between TOWRE-2 scores and RSQ mean stress level, which indicated that children with lower reading scores reported higher reading-

| Table 3. Correlations among variables included in mediation analyses |
|-------------------------------------------------------------|
| **Variable** | **1** | **2** | **3** | **4** | **5** |
|---------------|-------|-------|-------|-------|-------|
| 1. ID Age     | -     |       |       |       |       |
| 2. RSQ Primary Coping | -.15 | -     |       |       |       |
| 3. RSQ Secondary Coping | .13  | .59** | -     |       |       |
| 4. RSQ Disengagement Coping | .43* | -.36* | -.19  | -     |       |
| 5. SDQ Externalizing | -.38* | .08   | -.18  | -.14  |       |
| 6. SDQ Internalizing | -.42* | .02   | -.44* | -.26  | .37*  |

Note. ID Age: Age of Identification early = 0, late = 1 RSQ: Responses to Stress Questionnaire (modified); SDQ: Self-Description Questionnaire. Spearman correlations for ID Age; all else Pearson correlations.

** p < .001; * p < .05; all else not significant.
related stress levels, and negative relationships between Primary Coping and Stress, and Secondary Coping and Stress indicated greater primary and secondary coping strategy use associated with lower reading-related stress.

Notably, secondary coping as measured by the RSQ was negatively correlated with SDQ internalizing: as expected, children who endorsed more secondary coping items were less likely to endorse items indicating internalizing patterns. This is consistent with research by Compas et al. (2001) showing that when used appropriately secondary coping is protective against internalizing patterns, while disengagement coping (maladaptive secondary coping) is not.

6.1.3. Mediation via percentile bootstrap testing
Socio-emotional patterns and their relationships with age-of-identification were examined to test potential direct and indirect associations through coping preferences using non-parametric bootstrap confidence interval testing. The direct effect of age-of-identification on socio-emotional pattern provides an index of the unmediated association, while the indirect effect indicates the influence of age-of-identification on socio-emotional pattern via coping preference. This method for testing direct and indirect influences does not require meeting assumptions of normality, nor the presence of significant initial correlations (Hayes, 2018; Preacher & Hayes, 2008).

The PROCESS macro for SPSS was used to conduct the analysis (Hayes, 2018). Preacher and Hayes (2008) established that bootstrapping is preferred for mediation analysis as it yields adequate statistical power concurrently with good Type I error control. All results reported below are derived from percentile bootstrapping, resampling 10,000 times. Confidence intervals (CIs) are set at 95%. Non-standardized coefficients are reported in the text, and standardized coefficients are given in the figures.

**Age-of-identification and Self-Reported Externalizing Patterns Mediated by Primary Coping.**
The first mediation-by-bootstrapping analysis, testing the first hypothesis, indicated that although the total effects model was significant ($p < .05$), with age-of-identification accounting for 13.34 percent of variance in externalizing, the direct effect of age-of-identification was marginally significant. The marginal direct-effect showed a trend towards an association with externalizing patterns ($c^f = -0.359, SE = 0.177; p = .052; 95% CI [-0.722, 0.004]$; see Figure 1); no indirect association through primary coping strategy was found: $ab = -0.004, SE = 0.031; p > .05; 95% CI [-0.072, 0.065]. The association between age-of-identification and primary coping was not significant.

**Figure 1. Mediation model for age-of-identification relation with externalizing patterns mediated by primary coping strategies (standardized coefficients shown).**
(\(a = -0.011, SE = 0.012; p > .05; 95\% CI [-0.034, 0.013]\)), as was the association between primary coping and externalizing (\(b = -0.359, SE = 2.815; p > .05; 95\% CI [-5.408, 6.125]\)). These results indicate a weak direct link between age-of-identification and externalizing patterns, with a trend towards higher externalizing patterns in early-identified children, and no indirect influence of age-of-identification on externalizing via primary coping.

**Age-of-identification and Self-Reported Internalizing Patterns Mediated by Secondary and Disengagement Coping.** For the second set of mediation-by-bootstraping analyses (testing the second hypothesis), age-of-identification accounted for a significant proportion of the variability in internalizing patterns. In the mediation model involving secondary coping (see Figure 2), the total effect model indicated age-of-identification accounted for significant variance in internalizing patterns; \(p < .01; R^2 = .2186\). Early-identified children were associated with higher internalizing scores, contrary to our expectation. Age-of-identification showed a direct effect on internalizing patterns while controlling for secondary coping strategy; \(c' = -0.449, SE = 0.162; p < .01; 95\% CI [-0.782, -0.117]\), but no indirect association through secondary coping: \(ab = -0.051, SE = 0.098; p > .05; 95\% CI [-0.313, 0.064]\). The association between age-of-identification and secondary coping was not significant (\(a = 0.013, SE = 0.020; p > .05; 95\% CI [-0.027, 0.053]\)), but the association between secondary coping and internalizing was significant (\(b = -3.912, SE = 1.531; p < .01; 95\% CI [-7.048, -0.775]\)). These results indicate a direct link between age-of-identification and internalizing patterns, showing higher internalizing patterns in early-identified children, and no indirect influence of age-of-identification via secondary coping.

The same analysis was conducted with disengagement coping as the mediator (see Figure 3). Again, the total effect model indicated age-of-identification accounted for significant variance in internalizing patterns; \(p < .01; R^2 = .2186\). Early-identified children were associated with higher internalizing scores. Age-of-identification showed a direct effect on internalizing patterns while controlling for disengagement coping strategy; \(c' = -0.472, SE = 0.200; p < .05; 95\% CI [-0.882, -0.162]\), but no indirect association through disengagement coping strategy: \(ab = -0.028, SE = 0.106; p > .05; 95\% CI [-0.272, 0.154]\). The association between age-of-identification and disengagement coping was significant (\(a = -0.022, SE = 0.008; p < .05; 95\% CI [0.006, 0.039]\)), but the association between disengagement coping and internalizing was not significant (\(b = -1.272, SE = 4.079; p > .05; 95\% CI [-9.628, 7.085]\)). These results indicate a direct link between age-of-identification and internalizing patterns, with higher internalizing patterns in early-identified children, and no indirect influence of age-of-identification via disengagement coping.

**Figure 2.** Mediation model for age-of-identification relation with internalizing patterns mediated by secondary coping strategies (standardized coefficients shown).
The bootstrapping analyses indicated that age of identification accounted for marginally significant variance in externalizing patterns, and for significant unique variance in internalizing patterns in children with persisting struggles with reading. Indirect effects via coping strategy were not significant for either externalizing or internalizing patterns, indicating that coping strategy is not the best explanation for the age-of-identification and socio-emotional pattern relationships. The implications of these results are discussed below.

7. Discussion
The results demonstrate the importance of age-of-identification in the socio-emotional adjustment of children with persisting reading difficulty. Although age-of-identification was directly associated with socio-emotional patterns (marginally for externalizing but significantly for internalizing patterns), the influence of coping strategy preferences, though theoretically important for socio-emotional outcomes in children, did not provide an indirect route for age-of-identification to have effects on those patterns. Children’s socio-emotional adjustment outcomes were expected to be associated with the age at which reading difficulties were identified, and these relationships were hypothesized to be at least partially mediated by the type of coping strategies children used. Interestingly, early-identified children were more likely to express increased externalizing (marginally) and internalizing patterns.

7.1. Age of identification and socio-emotional adjustment
Although present as a marginally significant trend, early identified children showed a trend towards higher externalizing patterns, similar to our expectation. This trend is consistent with findings of Kempe and of Morgan and colleagues and can be interpreted within the context of social-information processing and an assumed mechanism of patterns of externalizing behaviours associated with reading difficulty becoming habituated as reading difficulties persist into mid-elementary school years. It is possible that children continue to demonstrate the same reactions to the stress of reading out of habit without changing their responses. The association between age-of-identification and internalizing patterns was contrary to our expectation: early-identified children with reading difficulty showed higher internalizing patterns than late-identified children. This finding, though unexpected, can be interpreted in relation to recent perspectives on the development of children’s socio-emotional adjustment. Leeuwis et al. (2015) found that children’s internalizing patterns were predicted by a combination of damaged self-esteem (higher implicit than explicit self-esteem) and experience of victimization (including physical and relational aggression). The authors found that children with high self-expectations (reflecting implicit self-esteem) and low actual performance (reflecting explicit self-esteem), which together lead to damaged self-esteem, were more likely to experience peer victimization and show internalizing patterns with age. It is possible that children with reading difficulties reflect similar patterns of damaged self-esteem and risk of experiencing victimization in school related to their poor reading performance leading to
internalizing patterns. Turunen et al. (2017) found increased victimization in children with reading difficulty; those experiencing internalizing difficulties being more likely to experience victimization (Turunen et al., 2019). Over time, this pattern could lead to increased internalizing related to experiences of persistent (early-identified) reading difficulty. Children experiencing and being identified with reading difficulties at a younger age may experience damaged self-esteem and be exposed to feelings of victimization for longer periods than later-identified children. Extended damaged self-esteem and victimization may leave early-identified children more vulnerable to developing internalizing patterns than later-identified children.

### 7.2. Coping preference as a mediator

The expectation that children’s coping strategies would be mediators, providing an indirect route for age-of-identification to influence socio-emotional outcomes, was not supported. However, late-identified children reported more use of disengagement coping strategies. This result is consistent with Sontag et al.’s (2008) finding that older girls were less likely to report using adaptive strategies, preferring involuntary disengagement strategies. Furthermore, Hampel and Petermann (2005) examined differences in coping strategy in children based on age, gender, and situational aspects. These researchers found that younger children’s (age 8 and 9) use of passive avoidance (a type of maladaptive coping strategy similar to disengagement) was dependent upon the demands of a particular situation. The specifics of the situation did not influence older children’s use of this or other avoidant coping strategies. Young children, however, showed use of disengagement coping strategies only with certain stressors whereas older children used this disengagement-like strategy across multiple stressors.

Considering that the late-identified group likely did not have to deal with the stress of poor reading until they were older, it is possible that they used disengagement coping strategies across multiple stressful situations (as suggested by Hampel & Petermann, 2005), including reading. The early-identified group did not report as high a level of disengagement coping strategy use, possibly because their earlier use of passive avoidance (secondary coping) may have depended on situation demands and on the availability of a more-limited repertoire of coping strategies. If the stress of reading did not align with the situational demands that led these children to use passive avoidance, they likely used a different type of coping strategy. Thus, early-identified children may continue use strategies other than passive avoidance/disengagement coping when experiencing reading stress.

### 7.3. Limitations and future research

Although we found that age-of-identification is a significant factor in socio-emotional outcomes (particularly in internalizing patterns) in children experiencing persisting reading difficulty, the links with coping strategies were tenuous, indicating the independence of coping from age-of-identification. A different set of variables might be involved in the mechanism linking age of identification and socio-emotional outcomes in children with persisting reading difficulty; options for further research include self-esteem discrepancies and victimization.

While the SDQ reliably measures socio-emotional outcomes reflecting externalizing and internalizing patterns, its validity in assessing exclusively socio-emotional adjustment is not clear. A number of items on the measure focus on characteristics beyond socio-emotional adjustment, such as questions related to self-perceived ability at school and school subject preference. Further, in a large-scale study considering children with literacy difficulties, Carroll et al. (2005) found that literacy difficulties were more likely to be associated with certain anxiety disorders over others. Separation anxiety and Generalized Anxiety Disorder were most closely linked to literacy difficulties in comparison to phobias (including social phobia) and panic disorder. Although the SDQ internalizing measure included sufficient coverage of anxiety symptomology to permit significant effects to emerge in the analysis, future research may benefit from using more-nuanced measures that focus on specific types of anxiety symptoms.
Parents’ retrospective reports for the measurement of age-of-identification may have introduced some inaccuracy in the actual dates of first identification of their children’s reading-related difficulties. Obtaining age-of-identification data from school records would have yielded more accurate information; unfortunately, this was not possible in the current study. Measuring reading comprehension in addition to decoding efficiency would have allowed us to determine if the patterns we identified were specific to efficiency in decoding, or if age of identification of specific reading comprehension difficulties is associated with similar outcomes.

Finally, the RSQ measure was adapted from a valid indicator of academic stress to focus specifically on reading-related stress and coping strategy preference for reading-related stress. It would be important to carry out follow-up research on the validity of the adapted version. However, the correlation between stress measured by the RSQ and TOWRE-2 scores for these participants who scored below average (< 95) was in the expected direction (more severe difficulties in reading—indicated by lower TOWRE-2 scores—were associated with higher self-reported reading-related stress) supports the validity of the modified RSQ.

Morgan and Farkas (2009), and Morgan et al. (2012) highlight the importance of the initial level of internalizing or externalizing pattern as a predictor of later socio-emotional adjustment outcomes. Parhiala et al. (2014) measured socio-emotional patterns before the identification of reading difficulties; their results highlight the importance of considering pre-existing patterns, and suggest that difficulties with inattention may co-occur in children with reading difficulty as opposed to being a secondary reaction to the development of reading problems. They also noted that parents’ ratings of poor-reader children’s adaptability scores improved over time in school. Although the current study did not have access to pre-literacy measures of socio-emotional patterns to use as autoregressors, future research on this topic which includes such information, particularly in the context of longitudinal studies, would illuminate how stress in children with reading difficulties, coping strategies, and socio-emotional adjustment are inter-related over time.

Age-of-identification of reading difficulty has a direct role in children’s socio-emotional adjustment, with elevated internalizing associated with early identification. Although coping style did not play a mediating role, early identification was associated with lower preference for disengagement coping style. In programming for reading concerns, educators should be mindful of early-identified children’s social and emotional needs at school, who can present with heightened internalizing patterns. Incorporating such information in classroom practice and in clinician-teacher consultations is especially important in the face of inherent difficulties in noticing and identifying internalizing patterns in children.

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Author details
Alyse Sukovieff
ORCID ID: http://orcid.org/0000-0001-9903-3942
Richard S. Kruk
E-mail: richard.kruk@umanitoba.ca
ORCID ID: http://orcid.org/0000-0003-2155-1568
1 Department of Psychology, University of Manitoba, Winnipeg, Canada.

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Appendix A Modified Response to Stress Questionnaire (RSQ)
This is a list of things about reading that children and teenagers sometimes find stressful or a problem to deal with. Please circle the number indicating how stressful the following things have been for you in the past 6 months.

|                                                                 | Not at All | A Little | Somewhat | Very    |
|-----------------------------------------------------------------|------------|----------|----------|---------|
| a. Doing badly on a reading test                               | 1          | 2        | 3        | 4       |
| b. Getting bad grades in reading                                | 1          | 2        | 3        | 4       |
| c. Not understanding what I’m reading                           | 1          | 2        | 3        | 4       |
| d. Feeling pressured to read                                     | 1          | 2        | 3        | 4       |
| e. Reading aloud in class                                       | 1          | 2        | 3        | 4       |
| f. Reading for homework                                         | 1          | 2        | 3        | 4       |
| g. Other: __________                                            | 1          | 2        | 3        | 4       |

Circle the number that shows how much control you generally think you have over these problems.
Below is a list of things that children and teenagers sometimes do, think, or feel when they are dealing with the stress of problems with reading. Everyone deals with problems in their own way – some people do a lot of the things on this list or have a bunch of feelings, other people just do or think a few of these things.

Think of all the stressful parts of problems with reading that you indicated above. For each item below, circle one number from 1 (not at all) to 4 (a lot) that shows how much you do or feel these things when you have the problems with reading like the ones you indicated above. Please let us know about everything you do, think, and feel, even if you don’t think it helps make things better.

Circle the number that shows how much control you generally think you have over these problems.

How much do you do this?

WHEN DEALING WITH THE STRESS OF READING:

Circle the response that shows how much you agree with the statement Not at all A little Some A lot

|   |   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 1. | I try not to feel anything. |   |   |   |   |
| 2. | When dealing with the stress of reading problems, I feel sick to my stomach or get headaches. |   |   |   |   |
| 3. | I try to think of different ways to change or fix the situation. |   |   |   |   |
| 4. | When reading problems happen, I don’t feel anything at all, it’s like I have no feelings. |   |   |   |   |
| 5. | I wish that I were stronger and less sensitive so that things would be different. |   |   |   |   |
| 6. | I keep remembering what happened with reading problems or can’t stop thinking about what might happen. |   |   |   |   |
| 7. | I let someone or something know how I feel. (ex. parent, friend, or stuffed animal) |   |   |   |   |
| 8. | I decide I’m okay the way I am, even though I’m not perfect. |   |   |   |   |
| 9. | When I’m around other people I act like my reading problems never happened. |   |   |   |   |

(Continued)
10. I just have to get away from everything when I am dealing with the stress of reading problems. 1 2 3 4
11. I deal with the stress of reading by wishing it would just go away, that everything would just work itself out. 1 2 3 4
12. I get really jumpy when I am dealing with the stress of reading problems. 1 2 3 4
13. I realize that I just have to live with things the way they are. 1 2 3 4
14. When I am dealing with the stress of having reading problems, I just can’t be near anything that reminds me of the problem. 1 2 3 4
15. I try not to think about reading. I try to forget all about it. 1 2 3 4
16. When I am dealing with the stress of having reading problems, I really don’t know what I feel. 1 2 3 4
17. I ask other people or things for help or for ideas about how to make things better. 1 2 3 4
18. When I am trying to sleep, I can’t stop thinking about the stressful aspects of reading or I have bad dreams about reading problems. 1 2 3 4
19. I tell myself that I can get through this, or that I will do better next time. 1 2 3 4
20. I let my feelings out. (such as writing in my journal/diary, drawing, listening to music, or punching a pillow) 1 2 3 4
21. I get help from other people or things when I’m trying to figure out how to deal with my feelings. 1 2 3 4
22. I just can't get myself to face the stress of having reading problems. 1 2 3 4
23. I wish that someone would just come and take away the stressful parts of reading problems. 1 2 3 4
24. I do something to try to fix the stressful parts of reading problems. 1 2 3 4
25. Thoughts about reading problems just pop into my head. 1 2 3 4
26. When I am dealing with the stress of reading, I feel it in my body. (ex. I feel hot and sweaty, my breathing speeds up) 1 2 3 4
27. I try to stay away from people and things that make me feel upset or remind me of reading activities. 1 2 3 4
28. I don't feel like myself when I am dealing with stress of having reading problems, it's like I am far away from everything. 1 2 3 4
29. I just take things as they are; I go with the flow. 1 2 3 4
30. I think about happy things to take my mind off the stressful parts of reading problems or how I'm feeling. 1 2 3 4
31. When something stressful happens related to having reading problems, I can't stop thinking about how I am feeling. 1 2 3 4
32. I get sympathy, understanding, or support from someone. 1 2 3 4
33. When something stressful happens related to reading problems, I can't always control what I do. (ex. I can't stop eating, (Continued)
I can't stop talking) 1 2 3 4
34. I tell myself things could be worse. 1 2 3 4
35. My mind just goes blank when
something stressful happens
related to reading problems, I
can't think at all. 1 2 3 4
36. I tell myself that it doesn't matter,
that it isn't a big deal. 1 2 3 4
37. When faced with the stressful
parts of reading problems, right
away I feel really:
-mad -worried -sad -scared
-none of these 1 2 3 4
38. It's really hard for me to
concentrate or pay attention
when something stressful
happens related to reading
problems. 1 2 3 4
39. I think about the things I'm
learning from the situation, or
something good that will come
from it. 1 2 3 4
40. After something stressful happens
related to reading problems, I
can't stop thinking about what
I did or said. 1 2 3 4
41. When stressful reading activities
happen, I say to myself,
This isn't real". 1 2 3 4
42. When I'm dealing with the
stressful parts of reading
problems, I end up just lying
around or sleeping a lot. 1 2 3 4
43. I keep my mind off reading by
doing other things. (such as
seeing friends, watching tv,
playing video games) 1 2 3 4
44. When something stressful
happens related to reading

(Continued)
problems, I get upset by things that don’t usually bother me.  

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 45. | I do something to calm myself down when I’m dealing with the stress of reading. (such as take deep breaths, pray, walk, listen to music) |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 46. | I just freeze when I am dealing with the stressful parts of reading problems, I can’t do anything. |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 47. | When stressful things happen related to reading problems I sometimes act without thinking. |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 48. | I keep my feelings under control when I have to, then let them out when they won’t make things worse. |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 49. | When something stressful happens related to reading problems, I can’t seem to get around to doing things I’m supposed to do. |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 50. | I tell myself that everything will be all right. |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 51. | When something stressful happens related to reading problems, I can’t stop thinking about why this is happening. |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 52. | I think of ways to laugh about it so that it won’t seem so bad. |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 53. | My thoughts start racing when I am faced with the stressful parts of reading problems. |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 54. | I imagine something really fun or exciting happening in my life. |   |   |   |

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 55. | When something stressful happens related to having reading problems, I can get so |   |   |   |

(Continued)
Appendix B SELF DESCRIPTION QUESTIONNAIRE (SDQ)
Here is a list of things that are very true for some people and not at all for others. Everyone feels it is a different level of true for them. Read each sentence carefully, and circle the one word (Not At All True, A Little True, Somewhat True, Very True) that tells about you best.

Circle the response that shows how much you agree with the statement

|   | Not At All True | A Little True | Somewhat True | Very True |
|---|-----------------|---------------|---------------|-----------|
| 1. | I have lots of friends | 1 | 2 | 3 | 4 |
| 2. | I am good at all school subjects | 1 | 2 | 3 | 4 |
| 3. | I feel angry when I have trouble learning | 1 | 2 | 3 | 4 |
| 4. | I get good grades in reading | 1 | 2 | 3 | 4 |
| 5. | I often argue with the other kids | 1 | 2 | 3 | 4 |
| 6. | Work in math is easy for me | 1 | 2 | 3 | 4 |
| 7. | I worry about taking tests | 1 | 2 | 3 | 4 |
| 8. | I enjoy doing work in all school subjects | 1 | 2 | 3 | 4 |
| 9. | It's hard for me to pay attention | 1 | 2 | 3 | 4 |
| 10. | I like reading | 1 | 2 | 3 | 4 |
| 11. | I make friends easily | 1 | 2 | 3 | 4 |
| 12. | I cannot wait to do math each day | 1 | 2 | 3 | 4 |
| 13. | Work in reading is easy for me | 1 | 2 | 3 | 4 |
| 14. | I often feel lonely | 1 | 2 | 3 | 4 |
| 15. | Work in all school subjects is easy for me | 1 | 2 | 3 | 4 |
| 16. | I get good grades in math | 1 | 2 | 3 | 4 |
| 17. | I get distracted easily | 1 | 2 | 3 | 4 |
| 18. | I am interested in reading | 1 | 2 | 3 | 4 |
Appendix C. Parent/Guardian Questionnaire

Please complete this questionnaire, as we would like to ensure that backgrounds of children in the study reflect the diversity of the community, and we would like to learn about your child’s history of reading struggles throughout school.

Demographic information (age, sex, parental education and family income, language background) will help ensure the group of children in this study reflects the diversity of the local community.

Child’s Full Name: ________________________________________________________________

|   | Not At All True | A Little True | Some-What True | Very True |
|---|----------------|--------------|----------------|-----------|
| 19. | I get along with kids easily | 1 | 2 | 3 | 4 |
| 20. | I feel sad a lot of the time | 1 | 2 | 3 | 4 |
| 21. | I cannot wait to read each day | 1 | 2 | 3 | 4 |
| 22. | I am interested in math | 1 | 2 | 3 | 4 |
| 23. | It’s hard for me to finish my school work | 1 | 2 | 3 | 4 |
| 24. | I am easy to like | 1 | 2 | 3 | 4 |
| 25. | I worry about doing well in school | 1 | 2 | 3 | 4 |
| 26. | I can do very difficult problems in math | 1 | 2 | 3 | 4 |
| 27. | Other kids want me to be their friend | 1 | 2 | 3 | 4 |
| 28. | I like all school subjects | 1 | 2 | 3 | 4 |
| 29. | I worry about finishing my work | 1 | 2 | 3 | 4 |
| 30. | I like math | 1 | 2 | 3 | 4 |
| 31. | I have more friends than most other kids | 1 | 2 | 3 | 4 |
| 32. | I worry about having someone to play with at school | 1 | 2 | 3 | 4 |
| 33. | I am good at reading | 1 | 2 | 3 | 4 |
| 34. | I get in trouble for talking and disturbing others | 1 | 2 | 3 | 4 |
| 35. | I like reading long chapter books | 1 | 2 | 3 | 4 |
| 36. | I enjoy doing work in math | 1 | 2 | 3 | 4 |
| 37. | I get in trouble for fighting with other kids | 1 | 2 | 3 | 4 |
| 38. | I look forward to all school subjects | 1 | 2 | 3 | 4 |
| 39. | I enjoy doing work in reading | 1 | 2 | 3 | 4 |
| 40. | I feel ashamed when I make mistakes at school | 1 | 2 | 3 | 4 |
| 41. | I am good at math | 1 | 2 | 3 | 4 |
| 42. | I get good grades in all school subjects | 1 | 2 | 3 | 4 |
Child’s gender (circle): Male Female

Child’s date of birth: Month _____ Day _____ Year _____

Child’s Age: ____________________________

Child’s School: _________________________

Child’s Teacher: _________________________

Please indicate your highest level of education:

• Less than High School

• High School

• More than High School

Highest level of education of the other parent/guardian (if applicable):

• Less than High School

• High School

• More than High School

Annual household income:

• Less than $25,000

• $25,000—$50,000

• $50,000—$75,000

• More than $75,000

Is your child fluent in English: Yes:______ No:_____

Does your child have normal/corrected to normal vision: Yes:______ No:_____

Does your child have special needs that could have an impact on his/her school experience?

Yes: _____ No: ______

If yes, please specify the nature of the special need(s):

_____ ADHD (attention deficit hyperactivity disorder that was diagnosed)
_____ Speech Impediment (e.g., stutter)
_____ Learning disability (e.g., reading disability, writing disability)
_____ Other. Please specify the nature of the special need(s): ________________

Number of brothers and/or sisters your child has: ________________

**Previous Reading Difficulty Questions**

We are interested in learning about your child’s previous reading experiences in school and about your child’s feelings.

Please indicate when your child was first identified with reading struggles at school. It may be difficult to remember that far back, but please try your best to answer as honestly and accurately as possible. When was your child first identified with reading struggles at school?:

Grade 1: ______
Grade 2: ______
Grade 3: ______
Grade 4: ______
This year/Grade 5: ______

Has your child received any formal additional reading help from school:

Yes: ______ No: ______

Other than help from family members, has your child received any formal additional reading help outside of school (i.e. private tutor, Kumon, etc):

Yes: ______ No: ______

Please circle the number that best corresponds with your opinions, perspectives, and experiences. Be sure to pay close attention to the number values for each response:

1 = Not at all, 2 = Not very much, 3 = Somewhat, 4 = Very much, 5 = Extremely.

Instructions: For the following question, please circle the number that best corresponds to your perception of your child’s difficulties in reading this year. Try your best to answer as honestly and accurately as possible.

1. How much does your child struggle with reading?

1—2—3—4—5

Not at all Not very much Somewhat Very much Extremely

2. Does your child find reading enjoyable?

5—4—3—2—1
3. How often does your child engage in activities that use reading (i.e. computer games, websites)?

5 ——————— 4 ——————— 3 ——————— 2 ——————— 1

Extremely often Often Sometimes Not often Never

When did you first notice your child was struggling with reading whether or not this was the same time that he/she was identified at school with reading struggles?

Grade 1: _____ Grade 2: _____ Grade 3: _____ Grade 4: _____ This year/Grade 5: _____