Reading Difficulties and Socio-Emotional Adjustment: Internalizing Patterns

Depend on Age of Identification

by

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Abstract

Children with reading difficulty experience stress in school and may develop negative socio-emotional adjustment. It is unclear what influences some students to experience externalizing patterns and others internalizing patterns. This study investigated the influence of the age of identification of reading difficulties on coping strategies and socio-emotional adjustment. 36 children (ages 9-12) from Winnipeg Schools and Child-Care centres completed measures of coping strategy and socio-emotional adjustment and their parents/guardians reported age of initial reading difficulty. Conditional processing 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 children who were identified with reading difficulties in Grade 2 or later were more likely to report using disengagement coping strategies but children identified with reading difficulties before Grade 2 were more likely to report higher internalizing patterns. Evidence for expected mediation by coping strategy was not found. These findings suggest that prolonged experience of reading difficulties is associated with greater risk of developing internalizing problems. Clarifying how age of identification of reading difficulty influences socio-emotional adjustment will help resolve theoretical debates and will help educators/clinicians to better serve students learning to read, and promote struggling readers' healthy socio-emotional adjustment.

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Identification

Literature Review

Learning to read is an essential part of every child's elementary school experience (Kempe,

Gustafson, & Samuelson, 2011). Children with reading difficulties experience school-related stresses

that can lead to negative socio-emotional adjustment involving externalizing (e.g. frustration/anger)

and internalizing (e.g. shame/anxiety) patterns (Kempe, Gustafson, & Samuelson, 2011; Undeheim &

Sund, 2008). 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; Lui, Chen, & Lewis,

2011). It is important to understand how to recognize, treat, and prevent these internalizing and

externalizing patterns in all children; but children with reading difficulty represent a special population

whose experiences of academic stress might place them at a higher risk of negative socio-emotional

development.

It is crucial to learn about the relationship between student reading difficulties and socio-

emotional adjustment as a first step to providing the most effective interventions possible for both of

these areas of need, as each can significantly and negatively impact a student's life. Reading difficulty

and negative socio-emotional outcome seem connected given that struggles with reading can lead to

negative emotions (e.g. frustration, anger, anxiety). These negative emotions then lead to behaviours

(e.g. task avoidance) that further reduce a child's attempts at reading practice – this may ultimately lead

to a cycle of reading struggles and negative emotions surrounding reading tasks (Morgan, Farkas, and

Wu, 2012). The aim of the current study was to gain more knowledge about age-related differences in

socio-emotional functioning among children with reading difficulties, and to explore a possible

mediating factor for these differences, involving types of strategies that children use in coping with

school-related stressors. In addition, the study aims to further our understanding of influences on the relationship between reading difficulties and socio-emotional symptoms. The results also have practical implications for teachers to better meet the needs of these children, and provide school clinicians and other education professionals insights on potential age-related risks to healthy socio-emotional development in children experiencing struggles with reading.

Reading is Stressful for Students with Reading Difficulties

The literature on behavioural and socio-emotional characteristics of students with reading difficulties indicates that experiencing reading difficulties is stressful to children and can lead to negative socio-emotional adjustment (Undeheim & Sund, 2008; Carroll, Maughan , Goodman, & Meltzer, 2005). Students who identify themselves as poor readers rate school as a major stressor and they indicate that they have many worries about going to school (Undeheim & Sund, 2008). Reading struggles are stressful to these students and can negatively impact their feelings towards school overall. Feeling stress and struggling with schoolwork can negatively impact a student's academic development and his or her socio-emotional adjustment.

In a meta-analysis of 55 studies comprising children from Kindergarten to Grade 12, Nelson and Hardwood (2011) found a medium effect size (d = 0.61) for the relationship between learning disability (LD) (including reading disability) and experience of internalizing issues. The authors found that teacher, parent, and student self-report ratings of internalizing patterns were significantly higher in comparison to those ratings for typical peers (Nelson, & Hardwood, 2011). These findings suggest that students with particular difficulties in learning and reading are at higher risk of experiencing negative socio-emotional adjustment than their typically developing peers.

Similarly, 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 with reading difficulties manifest symptoms and behaviours found in a variety of

psychiatric disorders including ADHD and anxiety (Carroll, et al., 2005). Notably, students with

reading difficulties had such a high association with symptoms of ADHD that this relationship

overshadowed the relationship between depressive symptoms and reading difficulties (Carroll, et al.,

2005). The relationship that was found between depressive symptoms and reading difficulties became

non-significant after controlling for the relationship between ADHD and reading difficulties. That the

relationship between ADHD and reading difficulties overshadows the relationship between reading

difficulties and depression indicates that externalizing patterns are very strongly associated with

reading difficulties.

Evidence That Younger Students with Reading Difficulties Show Externalizing Patterns

Reading difficulties are associated with externalizing difficulties, particularly in younger

children. When looking at the relationship between reading difficulties and the presence of symptoms

of ADHD, Kempe, and colleagues (2011) found that Kindergarten children whose reading difficulties

continued throughout Grades 1, 2, and 3 were more likely to experience inattention, hyperactivity, and

aggression than typically reading children, even after controlling for parent education level. There were

no age group differences in internalizing symptoms.

In addition to externalizing difficulties, early reading problems predict future behaviour

problems in the classroom. Morgan, Farkas, Tufis, and Sperling (2008) found in a large-scale study that

Grade 1 children in the lowest 10% of reading ability in the sample were more likely than the other

90% to display poor task-engagement, poor self-control and externalizing problems. Membership in the

poor reading group in Grade 1 predicted behaviour difficulties in Grade 3 (Morgan et al., 2008).

Interestingly, early problem behaviours (with the exception of inattention) did not predict reading

difficulties in a second assessment in Grade 3. This is consistent with the idea that reading difficulties

can lead to negative socio-emotional adjustment, but that reciprocal relationships are less likely to

exist: early problem behaviours do not predict later difficulties in reading.

Morgan and Farkas (2009) reported another example of younger children with reading difficulties showing externalizing patterns. They considered how early reading ability could uniquely predict negative socio-emotional patterns after controlling for the autoregressor. The autoregressor, the previously measured degree of the outcome characteristic under examination, can be a strong confounding factor of the outcome in studies considering other predictors of that outcome. Morgan and Farkas (2009) examined the autoregressor (an initial combined measure of externalizing and internalizing patterns), other risk factors (such as low socio-economic-status), and early reading skills as predictors of the student's internalizing and externalizing patterns as rated by teachers. The autoregressor (initial behaviour patterns) and reading skills were measured at entry into Kindergarten as predictors of Grade 3 socio-emotional adjustment. Students who, at Kindergarten entry, fell either within the lowest 15% of reading or highest 15% of internalizing or highest 15% of externalizing problems were selected for the analysis. Hence, the poorest readers and those experiencing the most internalizing or externalizing problems were chosen to examine how the occurrence of either reading or behaviour problems can influence later school outcomes. These cut-offs were chosen to allow the researchers to consider those students with poorest reading or highest degree of initial socio-emotional problems in the sample. Kindergarten children with low reading readiness (in the lowest 15%), were more likely to show externalizing symptoms in the spring of Grade 3 and in the spring of Grade 5, compared to the strong-reading group, even after controlling for the autoregressor (previously measured externalizing characteristics at Kindergarten). This was not the case for internalizing outcomes – low reading-readiness at Kindergarten did not significantly predict internalizing patterns in Grades 3 and 5 (Morgan & Farkas, 2009).

These findings suggest that young children with reading difficulties are at risk of experiencing externalizing symptoms. However, other research indicates that some children who struggle with reading are at risk of experiencing internalizing symptoms. An examination of those studies indicating

risk of internalizing symptoms reveals that age may be vital in explaining the socio-emotional patterns observed for children with reading difficulties.

Evidence that Older Students with Reading Difficulties Can Show Either Internalizing or Externalizing Patterns

The presence of internalizing as well as externalizing symptoms emerges when considering older students with reading difficulties. Willcutt and Pennington (2000) found that 10-year-old students with reading disabilities were more likely to show either externalizing (symptoms of ADHD, ODD, etc.) or internalizing (symptoms of depression and anxiety) patterns than their typically reading peers. A strong link between reading disabilities and ADHD-related symptoms was found in both boys and girls (Willcutt, & Pennington, 2000). In addition, both boys and girls showed heightened internalizing patterns in comparison to children without reading disabilities (Willcutt, & Pennington, 2000). For example, participants with reading disabilities showed heightened somatic complaints and depression in comparison to typical readers. These results contrast Morgan and Farkas's (2009) in which younger students with reading difficulties displayed only externalizing patterns; it appears that older students with reading difficulties can experience both externalizing and internalizing patterns.

Furthermore, Undheim and Sund (2008) found that that 12- to15-year-old students who identified themselves as having reading difficulties were more likely to experience symptoms of depression, higher school stress, and have more worries about going to school. These internalizing patterns (in addition to stress and worries) were identified in an initial study that considered only symptoms depression and low self-esteem, as well as in a follow-up study that considered a wider range of socio-emotional outcomes. One year later, the same students with continuing reading difficulties showed higher rates of both internalizing and externalizing problems, than typically reading peers (Undheim, Wichstrøm, & Sund, 2011). These results suggest, again, that older students with difficulties in reading are more likely than their typically reading peers to experience both internalizing and externalizing

patterns.

Similarly, children with poor reading scores in the spring of their Grade 3 year demonstrated both elevated externalizing and internalizing patterns with equal frequency in the spring of their Grade 3 and 5 years (Morgan, Farkas, & Wu, 2012). In this study, the authors suggested that the underlying mechanism for the relationship between poor reading and negative socio-emotional adjustment involves an increase in peer comparison: students may be comparing their reading skills to those of other students in the classroom, which then leads to the emergence of feelings of frustration (related to externalizing patterns) and depression (an internalizing pattern).

Using a subsample of students from the Early Childhood Longitudinal Study-Kindergarten, Morgan, Farkas, and Wu (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 scores in late Grade 3 were more likely to feel sad, angry, and unpopular in their Grade 5 year, compared to typically reading students (Morgan, Farkas, & Wu, 2012). The predictive associations between Grade 3 reading ability and Grade 5 socio-emotional outcome remained significant even after controlling for the autoregressors, poor math ability, and other demographic factors that were associated with internalizing and externalizing behaviours (Morgan, et al., 2012). The authors concluded that students with poor reading ability are likely to express anger, sadness and other internalizing or externalizing symptoms unless they are provided with adequate interventions to ameliorate these risks.

The above literature suggests that younger students with reading difficulties are more likely to display externalizing patterns only, while older students with reading difficulties are susceptible to 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. All children with reading

difficulty in the reviewed research studies by Morgan and colleagues had a higher than typical

likelihood to display socio-emotional difficulties and to develop further reading difficulties, but the age

at which their reading difficulties were detected was quite different in the samples of each study

(Kindergarten vs. Grade 3). Thus, it is possible that the difference in type of socio-emotional

adjustment outcome is related to the age at which the student's difficulties are identified.

Mechanism Connecting Age of Identification and Socio-Emotional Adjustment Outcomes

Socio-emotional adjustment may be influenced by the age-of-identification of reading difficulties

because of developmental differences in coping skills. People try to reduce the discomfort of stress by

using coping skills – patterns of thinking or behaving that are designed to change the stressor or the

way that the stressor is perceived by the individual (Rothbaum, Weisz, & Snyder, 1982). Coping skills

change with human learning and development.

Rothbaum and colleagues (1982) maintain that people use either primary or secondary coping

strategies to cope with stress. Primary strategies are those which involve attempts to change the

environment producing the stressor, while secondary strategies are those which attempt to change the

individual's perception of the stressor (Rothbaum, et al., 1982). These coping strategies can be adaptive

or maladaptive, typically depending on the level of actual control the person experiencing stress has

over the environment producing the stressor. For instance, when a person does not have the authority to

change a situation, the situation is uncontrollable and may not be well suited to certain types of coping

strategies.

Babb, Levine, and Arsenault (2010) outline that the first coping strategies people learn are

primary coping strategies. These are strategies that involve attempting to change the environment, and

these can be intrusive to others around the individual using the primary coping strategy. For example,

the first primary coping strategy that humans use is crying as a mechanism to produce change. When

infants cry they are learning their first response-outcome contingency, because the cry produced by the

child changes the environment as the parents come to aid the child (Babb, et al., 2010); this demonstrates a successful and adaptive use of a primary coping strategy to change the environment to reduce the individual's stress.

While primary coping strategies may help to reduce an individual's experience of stress, it is possible that some negative outcomes can be produced by the improper use of these strategies. Frustration, anger and exhaustion can occur if a person continues to use primary coping strategies in an uncontrollable situation (Babb, et al., 2010). Primary coping strategies attempt to make changes to the environment. Thus, when applied to an uncontrollable situation (such as in a classroom setting) these strategies become maladaptive (Babb, et al., 2010). A child who attempts to use a primary coping strategy to change the stressor in a classroom environment, for example by attempting to re-direct classroom attention during reading activities, may experience punishment (a maladaptive outcome) rather than support (an adaptive outcome). Because the classroom activities are not chosen and are uncontrollable by the student, the use of primary coping strategies may actually be maladaptive for the child who is feeling stress that was originally generated by his or her initial reading difficulty. He or she may begin to feel added stresses as a consequence of the disappointment in the failure to change the classroom environment in the attempt to relieve the initial source of stress (Rothbaum, et al., 1982).

In situations in which the person feeling stress has little actual control of the stressor, the use of secondary coping is more likely to produce a better outcome (in reducing stress) for the individual feeling stress (Babb, et al. 2010). Secondary coping strategies attempt to reduce stress or discomfort by changing one's own view or perception of a situation that is perceived as stressful and uncontrollable (Babb et al., 2010). For example, predicting future disappointment is a common secondary coping strategy (Rothbaum, et al., 1982). The internal predictive dialogue (e.g. the child's self-talk that helps the child to anticipate likely outcomes that will follow the stressful experience) can reduce stress by re-adjusting one's expectations and preventing greater disappointment had he or she expected to succeed

greatly at the original stress-provoking task. It is uncertain when secondary control strategies are first used in childhood; estimates of first ages at which such strategies emerge range from 5 to 11 years. A seemingly fair compromise from Babb and colleagues (2010) is that children do not begin to use these secondary coping strategies until age 7 or 8.

Although secondary coping strategies can be helpful in reducing stress, these coping strategies can also lead to negative outcomes for the individual when used incorrectly, and hence can be maladaptive. For instance, because of the change in the person's expectations, he or she may also adjust the effort devoted to a task. This change in expectation and effort can lead to passive behaviours and feelings of depression (Rothbaum et al. 1982).

One of the passive behaviours exhibited (in relation to children's maladaptive use of secondary coping strategies) is avoiding moderately difficult tasks to prevent anticipated feelings of disappointment/failure (Rothbaum, et al., 1982). This avoidance can be negative especially for a student learning to read; without practice in reading the student will continue to struggle, and will experience additional feelings of anticipated failure. Struggles with reading, with concurrent use of secondary coping strategies (avoidance of reading) can lead to continued struggles with reading as a consequence of reduced opportunities to develop reading skill. For example, students who identified themselves as poor readers are less likely to seek help than do typically reading peers (Undeheim, & Sund, 2008). Not seeking help in reading, combined with self-identifying as a poor reader are two passive behaviours reflective of maladaptive use of secondary coping strategies.

Compas, Connor-Smith, Saltzman, Thomsen, and Wadsworth (2001) argue that there is another type of coping strategy: disengagement. They argue that a person is likely to use a primary, secondary, or disengagement coping strategy when he or she is faced with stress. The disengagement coping strategy is generally maladaptive as it involves withdrawing from the stressor through thoughts such as wishful thinking or denial (Compas et al., 2001). The authors describe primary and secondary coping

strategies similarly to Rothbaum and colleagues (1982). Disengagement is quite similar to the maladaptive use of secondary coping described by Rothbaum and colleagues (2000). Both disengagement and maladaptive use of secondary coping strategies involve avoiding the stressor through distancing oneself from the stressor. Maladaptive secondary coping strategies involve distancing through thoughts, which ultimately lead to avoidance of the activity producing stress. Disengagement coping strategies involve distancing through withdrawal and denial of the problem leading to avoidance of the activity producing stress.

The avoidance behaviours that accompany maladaptive secondary coping strategies or disengagement coping strategies are likely to affect a student's self-esteem and emotional responses. Performance-avoidant attitudes are strongly positively correlated with anxiety and depression in Grade 5 and 6 students (Sideridis, 2005). This correlation was particularly strong for depression items related to academic performance and to social self-esteem. Students who held performance-avoidance goal orientations (e.g. preferences to not be graded or keep score) scored high on items indicating negative social self-esteem, negative affect, and oppositional-misbehaviour (items endorsed here indicate the child feels he or she is bad/naughty) (Sideridis, 2005). All of these items indicate the potential negative side effects of using secondary coping strategies in dealing with classroom-based stressors related to achievement.

Lowered self-esteem and negative affect are at the core of internalizing patterns. Children who experience stress in classroom reading activities, who then use maladaptive secondary coping strategies or disengagement strategies, begin to avoid stressful reading activities, which is related to lowered self-esteem and negative affect. Previous research has shown that stress can influence the development of internalizing patterns. Sontag and colleagues (2008) found that early adolescent girls who reported feeling higher levels of peer stress were more likely that girls with lower levels of this stress to develop internalizing problems. They reported that the "findings suggest that peer stress may lead to poor

coping skills" (p. 1171) and that "poor coping skills (e.g., using problem solving and emotion regulation less often and engaging in denial and wishful thinking more often), in turn, were associated with greater levels of internalizing distress" (p. 1171).

Thus children who use secondary coping strategies in a maladaptive way are at risk of internalizing issues. This is particularly true for students who use these strategies to relieve the stress of reading difficulties, given the high frequency of reading activities involved in early-and mid-elementary classrooms. Reading is a huge part of the elementary school experience, and because the reading-related failures that the child experiences are so often repeated these experiences can lead to diminished self-esteem rather than protection in the way the child originally intended. Hence, maladaptive use of secondary coping strategies can lead to internalizing issues like depressive symptoms and lowered self-esteem.

Because secondary coping strategies are argued to be unavailable to children at a young age, children who experience the stress of reading difficulties early in school, may be using primary coping strategies (e.g. attempts to re-direct classroom activity) which are available to the child from infancy. In contrast, children who do not experience the stress of reading failure until later years may use their newly developed secondary coping skills (e.g. reducing internal expectations) to deal with the stress of reading difficulties. Because they perceive the reading situation as uncontrollable and are equipped to use secondary coping strategies, they may use secondary rather than primary strategies. Children who are identified with reading difficulty at younger ages do not yet have these strategies in their repertoire of skills, and therefore rely on their primary coping strategies. Both primary and secondary coping strategies can be maladaptive, but the secondary coping strategies lead to internalizing patterns while primary coping strategies lead to externalizing patterns.

Extending this idea, children who are identified with reading difficulties at a younger age and continue to struggle with reading may continue to use primary coping strategies to deal with the stress

of reading failure. This persistent use of primary, rather than acquired secondary strategies can be explained by the social-information processing model (Crick, & Dodge, 1994). This model suggests that children learn patterns of assessing situations and reacting to those situations at an early age; these reactions and responses become familiar patterns as they are practiced over time and so become resistant to change over time. The authors suggest that "great weight is given to early experiences" (Crick, & Dodge, 1994, p. 81), thus these patterns of behaviour are repeated rather than changed. It becomes more efficient for the children to rely on these learned patterns of behaviour even if a different reaction may produce better outcomes (Crick, & Dodge, 1994).

Crick and Dodge's (1994) model suggests that children base their actions upon information gained from previous interactions that resemble the current situation; the actions then become well-learned and are more likely to be used again in future similar situations. Extending this to coping patterns implies that the coping patterns a child uses at an early age become familiar and resistant to change over time. Therefore, children who are identified with reading difficulties at an early age are likely to continue to use their primary coping strategies (which would be used over secondary coping strategies because children rely on their previously learned and now engrained primary coping strategies) as they continue to struggle with reading. In contrast, children who do not experience the stress of reading until they are older may use secondary coping strategies over primary strategies because reading stress is a new difficulty to deal with – these children have not had the practice effects of using primary coping to handle the stress of reading.

Identification of Reading Disabilities at Different Ages

One important assumption of this research project is that reading difficulties can emerge at different ages. While there are major inconclusive debates about different *subtypes* of reading disabilities, the literature to date concedes that some students are not be identified with reading disabilities or reading difficulties until their later school years (e.g. Grade 4 or 5). For instance, in a

study of students in Grades 2 through 10, Catts and colleagues (2012) found that students with late-emerging reading disabilities "represented about 42% of all those classified as poor readers across grades" (Catts, et al., 2012, p. 176). Catts and colleagues (2012) had a large enough sample of students with late-emerging reading disabilities that they were able to consider different types of reading disabilities (disabilities with decoding, or fluency, or comprehension) expressed later in school years.

Leach, Scarborough, and Rescorla (2003) went so far as to consider the different type of difficulties expressed by late identified reading disabled students. Their results suggest students with reading disabilities who are identified later in school (Grade 4 or 5) are more evenly spread amongst reading difficulty types than are students who are identified early in school (before Grade 3) (Leach, et al., 2003).

Onset vs Identification

It is important to discuss the issue of the age of onset versus the age of identification. In regard to reading difficulty, the age of onset is the age at which a student first begins to experience difficulty reading beyond what might be typically expected; the age of identification is the age at which the student's difficulties are identified or formally assessed by the teachers, student, and guardians involved in the student's learning to read. While it would be ideal to include the age of onset in studies like the current one, it is not always feasible to do so. Because it is usual for students to show some difficulty in learning to read when they first begin, and because there are students who can circumvent their difficulty in a variety of ways, the age of onset of a reading difficulty is extremely hard to identify (Leach, et al., 2003). The best measure that researchers have of the age of onset of a reading difficulty is the age of identification. While the use of the age of identification is considered appropriate, it is important to remember the possibility that the age of onset may have been earlier without having being identified due to a variety of factors (overwhelmed teacher, student finding ways around the problem, presence of children with more serious reading difficulties requiring more intensive use of resources,

and more).

Gender Differences of Internalizing and Externalizing

The literature considering gender differences in younger children's psychopathology is less definite than is literature considering gender differences in adolescents or adults. However, there is convincing evidence of some notable differences between boys and girls in the expression of socio-emotional difficulties. Externalizing patterns (especially those related to ADHD) are more likely to be identified in 8 to 15-year-old boys than in comparably aged girls (Whitcomb & Merrell, 2013). Prevalence rates of other externalizing patterns, such as conduct disorder and oppositional defiance disorder, are also higher in pre-adolescent boys than in girls (Whitcomb & Merrell, 2013).

Conversely, rates of internalizing patterns are higher for pre-adolescent girls than boys. Symptoms of depression and anxiety tend to be reported more frequently in girls than in boys (Whitcomb & Merrell, 2013). It is worth noting that participants with reading disabilities showed increased somatic complaints at equal rates between genders. This suggests that there may be gender differences in the expression of internalizing patterns for children with reading difficulties.

These gender differences in experiences of socio-emotional adjustment are important to consider in assessing children for diagnostic and research purposes. Although older children of either gender may display internalizing or externalizing patterns, these gender differences indicate that pre-adolescent boys and girls might have different expressions of socio-emotional difficulties despite possible similarities in the age at which they begin to express reading difficulties.

Given the heterogeneity of socio-emotional symptoms that have been identified, there is ambiguity about the nature of socio-emotional development risks faced by children with reading difficulty. This raises important questions that need to be answered to resolve this ambiguity, and to allow a better understanding of the risks children with reading difficulties face in school contexts: Under what circumstances are children more likely to experience internalizing or externalizing

patterns, and why – what are the factors that can determine the pattern of socio-emotional outcome? These were the core questions of this research project with a consideration of the age of identification as a potential explanation.

Hypotheses

Based on the above literature review, several hypotheses about the nature of socio-emotional adjustment of children with reading difficulties were developed. First, children who were identified with reading difficulties early (children identified with reading difficulties in Grade 1 or earlier), were predicted to show heightened externalizing patterns. This was expected because the early experience of failure-related stress in school occurred when children had not yet learned secondary coping skills to deal with the stress of reading difficulty; thus using their primary coping skills leads to displays of externalizing rather than internalizing patterns. These students were expected to continue to display externalizing patterns rather than internalizing at the later age because their associated coping patterns, that are assumed to have begun with their early struggles in reading, would persist along with the reading difficulty (in keeping with Crick and Dodge's social information-processing theory [1994], which suggests that early-learned reactions are maintained and resistant to change).

Second, late-identified children (children who were not identified with reading difficulties until Grades 2-5) were expected to show heightened internalizing patterns. Although they have learned secondary coping skills, these were expected not to be sufficient to ameliorate risk of negative socio-emotional adjustment; it is the quality of adjustment that was expected to be influenced. Thus, these students were expected not to show externalizing patterns but rather display internalizing patterns as a function of applying maladaptive secondary coping strategies or disengagement coping strategies.

Finally, gender and SES were expected to influence the relationship between reading difficulties and socio-emotional adjustment outcomes. Boys with reading difficulties were predicted to display more externalizing patterns than girls in keeping with the literature on gender differences (Whitcomb &

Merrell, 2013). Also, girls and children from higher SES households were expected to be less likely to show externalizing patterns.

Method

Participants

Forty-five children (age 9-12) were recruited from Winnipeg schools and child-care centres. Parents provided consent for their children to participate. All children had normal/corrected to normal vision. Twenty-four children participated at schools during typical hours and 21 participated at a University lab space, community centre, Learning Disabilities Association of Manitoba, or child-care centres during evenings and weekends. Participants from schools and child-care centres were nominated to participate by teachers/early-childhood educators as children who showed evidence of struggling with reading. Parents/guardians of children completed parent measures (see Appendix A, described in Materials section) at their convenience and returned the forms to the researcher via mail or the classroom teacher.

Parents/guardians of 14 participants reported that their child received help for reading outside of school; one participant's parent did not indicate whether or not his/her child received help outside of school. Twenty-eight participants' parents/guardians reported that their child received help for reading in school; two participants' parents did not indicate whether or not their child received help in school.

Children worked with a volunteer or the author to complete the measures described in the following section. The study was approved by the Psychology/Sociology Human Ethics Board at the University of Manitoba.

Materials

Children were measured on reading ability (Test Of Word Reading Efficiency-2 [TOWRE-2], Torgesen, Wagner, Rashotte, 2012), intelligence (vocabulary and matrix reasoning subsets of Wechsler Abbreviated Scale of Intelligence-2 [WASI-II]; Wechsler, 2011), and they completed rating scales of a

revised version of coping strategy (Response to Stress Questionnaire – School [RSQ], Compas, 2000) and socio-emotional adjustment (Self Description Questionnaire [SDQ] http://nces.ed.gov/ecls/pdf/thirdgrade/childselfdescription.pdf). Parents/guardians completed a measure of the child's socio-emotional adjustment (Behavior Assessment System for Children-2 [BASC-2], Reynolds, & Kamphaus, 2004) and a demographic questionnaire including information about the child's reading history – specifically the grade at which the child's reading difficulties began.

Reading Ability

Participant reading ability was measured with the TOWRE-2 (Torgesen, Wagner, Rashotte, 2012). This measure was chosen for its feasibility and because it is widely accepted in reading research. Reliability coefficients range from 0.87-0.95 (Torgesen, Wagner, Rashotte, 2012). Children are asked to read two lists of words out loud as quickly and accurately as possible; one list of real words and the other of pronounceable nonwords. The TOWRE-2 provides standardized T-scores that were used to establish whether early and late identified groups were reading at comparable levels.

Intelligence

An estimate of children's Intelligence Quotient (IQ) was determined with two subsets, Vocabulary and Matrix-Reasoning, of the WASI-II (Wechsler, 2011) in order to ensure that students included in the study had cognitive abilities within the average range (not more than two standard deviations below the population mean). This measure was chosen because it is a quick and reliable estimate of intelligence used widely in research. The WASI-II's reliability coefficients range from 0.87-0.97 (Wechsler, 2011). This measure was used to ensure that student differences in socio-emotional adjustment were related to reading difficulties rather than intelligence differences.

Response to Stress

Participant coping strategies were measured with an adaptation of the RSQ-school version which measures how children attempt to cope with the stresses they face in an academic environment. The

adaptation included changing the wording of the items in the original version to direct children's

attention to school-related experiences involving reading (See Appendix B). The factors derived from

this instrument that were used in the present study were primary coping strategies, secondary (adaptive)

coping strategies, and disengagement (maladaptive) coping strategies (Compas, et al.,2000).

The RSQ uses proportional scoring. These proportional scores are based on the total number of

items endorsed (Connor-Smith et al., 2000). Children's degree of use of each coping strategy of interest

(primary, secondary, and disengagement) was measured to determine the extent to which each

influences socio-emotional adjustment outcome. Because the measure was altered to focus on

children's reading-specific stress responses, a published reliability measure is unavailable. However,

split-half reliability testing indicated that this measure is highly reliable (Spearman-Brown coefficient =

0.90).

Socio-Emotional Adjustment

Children's socio-emotional adjustment was measured using a self-report scale (SDQ, see

Appendix C). This measure has strong psychometric properties and was chosen because it was the

measure used by Morgan and colleagues in their studies of socio-emotional adjustment in children with

reading difficulties (Morgan, & Farkas, 2009; and Morgan, Farkas, & Wu, 2012). Like the RSQ, the

SDQ measures uses proportional scores based on the total number of items endorsed and the 'strength'

of the endorsement. The SDQ asks how 'true' an item is for a child in a 4-point Likert scale. The

reliability of the SDQ "has repeatedly been identified as a measure with strong psychometric and

theoretical construct properties" (Morgan, Farkas, & Wu, 2012, p. 365).

Children's socio-emotional adjustment was also measured through parent-report with the Parent

Rating Scale (PRS) of the BASC-2 (Reynolds, & Kamphaus, 2004). The BASC-2 PRS is also a Likert

scale and provides *T*-scores with a mean of 50 and a standard deviation of 10. This measure was chosen

in order to compare the groups on child socio-emotional adjustment. The reliability coefficients of the

BASC-2 PRS's rating of Externalizing and Internalizing patterns fall within the 0.90's range (Tan, 2007). Both self-report (SDQ) and parent-report (BASC-2 PRS) measure of socio-emotional adjustment were used to consider possible differences in self-report and parent-report.

Demographic Measures

Finally, parents were asked additional questions regarding demographic factors of the family (e.g. parent level of education). Any significant correlations with these factors were flagged in order to consider for use as control variables in the analysis. Parents were asked about the child's history of reading difficulty – specifically what grade their child began to struggle with 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.

SES variable preparation

The researcher created a variable from questions on the demographic measure to indicate socio-economic status (SES) risk (families with low income and low highest level of parent education). Low SES was defined as family income less than $50,000 and highest level of parent education high school or below. Thirteen participants' families qualified as Low SES and twenty-three participants' families qualified as not-at-risk SES in either a medium or high SES group.

Procedure

Teachers nominated struggling readers from the class – "struggling reader" was defined as any student who is having difficulty reading at grade level as evidenced by decoding or comprehension issues. Individuals that participated through the University or community centres were self-reported poor readers. Parents were given a package explaining the study along with parental consent forms and the BASC-2 PRS. Parents were asked to return the completed forms to the children's classroom teachers; parents returned forms directly to the researcher when participating at the University or

community centre.

Upon return of the parental consent forms, students were taken to a quiet room in the school to complete the study. Participants were introduced to the study with an explanation that they were not being graded on their answers and that any answers they provided were confidential. Children were reminded that they could withdraw from the study at any time without penalty. Before beginning the study, children provided verbal assent.

Participants completed the tasks individually. Approximately 50 minutes was required to complete all measures. The author or a research assistant conducted the assessments and provided reading assistance to students if they had difficulty reading any items on the self-report of socio-emotional adjustment or coping strategies. Assistance was given only with reading of the questions; no help was given to the student in choosing an answer. Upon completion of all the measures, the author or a research assistant thanked the student for participating, debriefed with him or her, and provided him or her with student and parent compensation (pencil and stickers for student, *Tim Horton's^{TM}* card for parent) as appreciation for participating in the study. At the end of the study, teachers were given books for their classrooms as appreciation for their help for this study.

Data Preparation

Data were entered manually by two volunteers and the researcher; SPSS v. 22.0 was used to manage data and to carry out statistical analyses.

Excluded Data

Participant data were excluded if demographic information indicated that the child was not fluent in English (asked of parents in parent-questionnaire, see Appendix A) or if the child's IQ score was below 70 (as this is 2 or more standard deviations below average IQ). This led to 2 participants' data being excluded (one for lack of English fluency and one for IQ score). These participants were excluded in order to ensure that differences in groups were not influenced by a lack of understanding of

English language or cognitive ability rather than difficulties with reading or coping strategy.

Age of Identification was coded 0 for early-identified struggling readers and 1 for late-identified struggling readers. Early-identified struggling readers were defined as children whose guardians reported that their difficulties with reading began in Grade 1 or earlier while late-identified struggling readers were those whose guardians indicated issues began in Grade 2 or later. Seven parents/guardians did not indicate the grade at which the child began to struggle with reading; thus these cases were excluded from the data analysis as this is a vital piece of information for this project. Although this may have an important effect on results, this study's focus considers the age-of-identification and there is no other way to safely predict this key piece of information. Furthermore, a comparison of the participants excluded and included in the final data set showed that there were no significant differences on SDQ scores, RSQ scores, TOWRE-2 scores, or WASI-II scores. One significant difference between those excluded and included was found; the average age of those excluded (9.40) was lower than those included (10.53) ($t = 4.185$, $p = 0.006$, df = 41). Another significant difference was on BASC-2 PRS[1] ratings of internalizing behaviours ($t = 2.818$, $p = 0.013$, df = 26) in which included participants scored higher (55.31) than the scores of participants who were excluded (49.00). All results following (except those about the BASC-2 PRS) involve the final set of included participants (N = 36).

Missing Data

In addition to the 9 excluded participants (7 grade, 1 EAL, 1 IQ), several participants did not have complete data sets. Three participants' parents/guardians did not indicate family income. While this may have had an influence on the SES variable for the sample the inclusion of these 3 additional

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[1] The smaller sample comparing the BASC-2 scores is due to the number of participants whose parents/guardians did not return completed BASC-2 PRS forms, further explained in the Missing Data section.

participants would likely not have greatly altered the relationship of this variable and others of interest in the study; these three families were therefore included in all analyses.

In addition, a large number of parents/guardians did not include return/complete the BASC-2 PRS. Because measures from the BASC-2 PRS were not essential to the main hypotheses (as the SDQ was also used to assess socio-emotional adjustment), children whose parents/guardians did not complete these forms were not excluded (See Mediation Analysis Plan section for further detail). Although 26 BASC-2 PRS forms were returned but not all of these were fully completed. Eight male and 17 female participants' parents returned complete BASC-2 PRS forms. One male participant returned the form that was not completely rated, so allowed for an externalizing, but not internalizing, score to be calculated. Thus the researcher received enough information from BASC-2 PRS forms to get an externalizing score for 26 children, and an internalizing score for 25 children. These scores are reported as descriptive statistics (See Tables 1 and 2) but were not included as outcomes for inferential statistics.

Mediation Analysis Plan

The mediation analyses were originally planned to examine the socio-emotional outcome by child and then parent report (SDQ then BASC-2 PRS). Because so many families did not provide completed data from the BASC-2 PRS, the researcher decided to focus instead on the child report of socio-emotional outcome through the SDQ. When conducting the mediation analyses with the SDQ scores, all participant data was included, including those of children whose parents had not completed the BASC-2 PRS, in order to maximize the sample size. Exploratory analyses using the completed BASC-2 PRS questionnaires showed that only the Age-of-Identification and RSQ Disengagement scores were marginally significantly related ($r = .38$, $p = 0.059$, n = 26). Therefore, further analyses using BASC-2 PRS scores were not conducted.

Results

Because age-of-identification, gender, and SES-risk are dichotomous variables, meaning that they are not normally distributed, any analyses including these variables was conducted with non-parametric methods. The Shapiro-Wilk test was used to test normality of the continuous variables. Sample distributions for RSQ disengagement coping ($p = 0.028$) were found to be statistically significantly different from a normal distribution. This indicated that this variable also needed to be tested with non-parametric analyses.

Descriptive Statistics and Age-of-Identification Group Differences

After preparing the data as described above, 36 participants remained (18 male and 18 female). The majority of participants were age 11 (See Table 1). Mean age was 10.53 years ($SD = 0.696$). Eighteen children were early-identified (identified in Grade 1 or earlier) and 18 children were late-identified (identified in Grade 2 or later; seven in Grade 2, five in Grade 3, one in Grade 4, and five in Grade 5).

The RSQ measured participants' relative preferred coping strategies but it also measured their overall stress level during reading activities. Participants' average rating of stress level was elevated ($M = 2.36$, $SD, = 0.71$ from a possible range of 0-4 average stress rating). There were no group differences in average stress score ($t = 0.22$, $p = 0.983$, $df = 34$) (see Table 2 for group differences). Further discussion of participant stress ratings will be reviewed in the Discussion section.

The mean reading score of the entire sample as measured by the TOWRE-2 fell within the "Below Average" range ($M = 80.61$, $SD = 17.63$) with 16 participants falling below the sample's average and 20 scoring above the sample's average. The entire sample's TOWRE-2 scores ranged from 53-119. The "Below Average" range of the TOWRE-2 includes scores of 80-89. Six participants (4 in the early-identified group, 2 in the late-identified group) scored within the 'Average' range (90-1110) and 4 participants (all in the late-identified group) scored within the 'Above Average' range (111-120).

None scored above 120 which would indicate 'Superior' to 'Very Superior' decoding skills. Students who were identified by parents/guardians or teachers as having difficulty with any aspect of reading are still identified as poor readers and therefore were included in the study despite high TOWRE-2 scores. Further discussion of the TOWRE scores is found in the discussion section below.

The early and late identified groups' TOWRE scores did not significantly differ from one another ($t = 1.709$, $p = 0.097$, $df = 34$). The range of TOWRE-2 scores for the early-identified group was slightly lower than that of the late-identified group (53-103 and 55-119 respectively, see Table 2 for group means).

The mean IQ score as measured by the WASI-II fell just below the "Average" range ($M = 89.25$, $SD = 11.55$). The "Average" range of the WASI-II includes scores of 90-109. The minimum IQ score for this sample was 72 and the maximum score was 115. Early-identified children showed a trend towards higher scores than Late-identified chidren on WASI-II ($t = 2.034$, $p = 0.051$, df = 34). Because IQ was not significantly different between groups, and did not correlate significantly with any other variable, this factor was not included in subsequent analyses.

Gender Differences

There were no significant differences between genders for any variables. One variable (SDQ Externalizing) showed a marginally significant difference with girls being more likely to endorse externalizing items than boys ($t = -1.989$, $p = 0.055$, df = 32.968). The mean SDQ Externalizing score for Males was 2.22 ($sd = 0.45$), and for Females was 2.53 ($SD = 0.49$).

Pearson Correlations

The correlations reported here use only variables that met assumptions of parametric testing (see Table 3). Age was not significantly correlated with any other variables included in this type of correlation. Externalizing patterns as measured by the BASC-2 PRS were significantly negatively correlated to TOWRE-2 scores $(r = -.41$, $p = 0.044$, n = 25); this indicates that children who scored

lower in reading were more likely to show externalizing patterns as rated by their parent/guardian in the BASC-2 PRS. As noted earlier, the groups did not differ in their TOWRE-2 scores, therefore each group can be assumed to include participants with low and high reading scores.

Secondary coping, as measured by the RSQ, was significantly negatively correlated with internalizing patterns as measured by the SDQ ($r = -0.39$, $p = 0.022$, n = 34): children who endorsed more secondary coping items were less likely to endorse items indicating internalizing patterns. This is consistent with the research by Compas and colleagues (2001) that indicated that when used appropriately, secondary coping provides a protective factor from internalizing patterns while disengagement coping (maladaptive secondary coping) would not provide this protection.

Spearman Correlations

The correlations reported here are non-parametric; at least one variable in each pair did not meet assumptions of normality and this type of correlation can capture non-linear relationships. Gender significantly positively correlated with disengagement coping as measured by the RSQ ($r = 0.35$, $p = 0.038$, n = 36). This indicates that girls were more likely than boys to endorse items of disengagement coping.

Participants with Low SES-risk were more likely to receive help for reading outside of school (r = -0.39, p = 0.022, n = 35). There were no other significant correlations with this SES variable; because SES-risk was not correlated with outcome of coping strategy variables, it was not included in further inferential analysis. In addition, SES was not significantly different between early and late identified groups *(chi-square = 2.78, p = 0.096)*.

Age-of-identification and disengagement coping style were significantly positively related ($r = .40$, $p = 0.015$, n = 36) indicating that children identified later with a reading difficulty were more likely to use disengagement coping styles. Age-of-identification and self-reported internalizing patterns were significantly negatively related ($r = -0.37$, $p = 0.030$, n = 35) indicating that children identified earlier

with reading difficulties were more likely to report internalizing patterns on the SDQ.

Main Analyses: Mediation

Socio-emotional adjustment patterns measured by the SDQ were analyzed because the self-report measure showed more significant relationships to the key variables than did the BASC-2 PRS, and because not all parents completed the BASC-2 PRS forms.

Mediation analyses are used to help determine whether a relationship between two variables is explained by a third variable. In our case, mediation analyses were used to show if the relationship of socio-emotional outcome and age-of-identification is a function of coping strategy (see Figure 1 for a depiction of this mediation).

Originally, mediation via causal step processing analyses was planned. In order to conduct mediation analysis this way, all the variables included must meet assumptions of normality and must correlate significantly with one another. Unfortunately, of these critical correlations, only two were significant (see above Correlations section) and two variables were not normal (age-of-identification and disengagement coping). Because not all of the assumptions were met, mediation via causal step analyses were not conducted; instead a different approach to perform mediation analyses was used and is discussed below.

Mediation Via Percentile Bootstrap Testing

A non-parametric bootstrap confidence interval testing via conditional processing was conducted. Bootstrapping is a procedure of re-sampling with replacement from the scores in the dataset in order to evaluate that a correlation is significantly different from 0 by comparing it to other possible correlation values that could be obtained from the raw data scores. This analysis was used because it provides a powerful method for considering mediation without needing to meet the assumptions of normality or that the initial correlations reach significance (Preacher, & Hayes, 2008).

The PROCESS macro for SPSS was used to conduct the analysis (Hayes, 2013). The program

resamples with replacement a number of combinations of the raw data scores chosen by the researcher

(in this case 5,000). Rather than using significance testing, the program provides Confidence Intervals

(CIs). Using CIs is different than using p-values and the interpretation is slightly altered from the

traditional hypothesis-testing approach. Rather than discussing if a finding is significant ($p < .05$), CIs

are discussed as the likelihood that the intervals would remain within that range even if the analysis

were repeated with different data points drawn from the same sample of scores over and over again.

CIs reflect that we can be 95% certain that the 'true' number lies between the upper CI and the lower

CI (Hayes, 2013). Most often, if CIs contain 0, the effect is considered to be not truly different from 0.

Preacher and Hayes argue that bootstrapping should be used "over the Sobel test or causal steps

approach, on the grounds that the former have higher power while maintaining reasonable control over

the Type I error rate" (2008, p. 880).

Bootstrapping mediation analyses provide information on direct, indirect, and total effects of

the independent variable on the dependent variable. The direct effect indicates the predictive power of

the independent variable (in this case age-of-identification) without passing through the mediator (in

this case coping strategy). This direct effect shows the extent to which the dependent variable can be

predicted by the independent variable while controlling for the mediator (path *c'* in Figure 1).

The indirect effect is the proportion of the variance accounted for by the combination of the

independent and mediator variables. This means, the indirect effect shows how much of the variance in

the dependent variable (in this case socio-emotional adjustment outcome) can be predicted by the

independent variable only through the assistance of the mediator variable (the indirect effect is the

product of paths *a* and *b* in Figure 1).

The total effect is the amount of variance of the dependent variable that can be predicted by the

independent variable alone; the total effect is equal to the sum of the direct effect (predication by the

independent variable while controlling for the mediator) and indirect effect (prediction by the

independent through the mediator variables). This means that the total effect is the percentage that we can predict the outcome based on the whole model.

All results reported below are derived from percentile bootstrapping while resampling 5,000 times. All CIs reported are set at 95%.

Age-of-identification and Self-Reported Externalizing Patterns Mediated by Primary Coping

In the first mediation by bootstrapping analysis (used to address the first hypothesis), age-of-identification appeared not to have an influential direct or indirect effect on externalizing patterns (as the CIs for both effects included zero [-0.639, 0.022], and [-0.046, 0.047] for direct and indirect effects respectively). Since both CI ranges contained 0, it is not likely that age-of-identification reliably predicts externalizing patterns in children with reading difficulties.

Age-of-identification and Self-Reported Internalizing Patterns Mediated by Disengagement Coping

For the second mediation by bootstrapping analysis (used to address the second hypothesis), age-of-identification appears to predict some of the variability in internalizing patterns. Overall, age-of-identification showed an effect on the variance in internalizing patterns (*total effect* = -0.411, CIs [-.740, -.083]). When looked at its relationship to internalizing patterns while controlling for coping strategy, age-of-identification seems to have had some direct effect on internalizing patterns (this may be considered 'marginal' as the CIs have crossed 0 but quite minimally - *effect* = -0.341, t = -1.924, p = 0.063, CI's [-0.701, 0.020]). However age-of-identification does not have an indirect effect on internalizing patterns as the CIs crossed zero [-0.267, 0.057].

The bootstrapping analyses presented above suggest that mediation via coping strategy is not the best explanation for the relationship among these variables. In a further exploratory analysis of multiple parallel mediators, namely the two coping strategies of interest (primary and disengagement coping), the CIs all contained zero, thus indicating that multiple parallel mediation is not the best

explanation for the relationship among self-reported internalizing, age-of-identification, primary, and disengagement coping. However, a number of interesting correlations in the data were found and will be discussed below in the Discussions section.

Discussion

The original hypothesis was that children's socio-emotional adjustment outcomes would be predicted by the age at which they were identified with reading difficulties and that this relationship would be explained by the type of coping strategy the child used to cope with the stress of reading. This hypothesis was based on research indicating that older children with reading difficulties show both internalizing and externalizing patterns (Wilcutt & Pennington, 2000; Morgan, Farkas, & Wu 2012; Undheim & Sund, 2008; Undheim, Wichstrøm, & Sund, 2011) while younger children with reading difficulties show only externalizing patterns (Morgan et al., 2008; Kempe et al., 2011; Morgan & Farkas, 2009). The assumption was that children who do not experience difficulties reading until later in school would use different approaches to handling the stress of reading because of a wider repertoire of coping strategies available to them at an older age (Babb et al., 2010).

Socio-Emotional Adjustment Hypotheses

This study yielded interesting and unexpected relationships amongst coping strategies, age-of-identification and socio-emotional adjustment outcomes. The results show that age-of-identification is connected to internalizing patterns in children with reading difficulties but in a direction that was contradictory to the expectations put forth by this study - participants with higher internalizing patterns were more likely to have been identified with reading difficulties earlier rather than later as predicted.

This unexpected relationship may have been found for a variety of reasons. Specific details of this particular study may have influenced the outcome of the relationship. For instance, the measurement of age-of-identification relied solely on parents' retrospective memories of their children's histories of reading difficulties. It is possible that many parents' memories of the age at

which their child began to struggle with reading are imperfect and that they indicated an earlier age than the actual date of first identification of these difficulties. This relationship may also have been influenced by a type of selection bias related to the number of participants whose parents did not indicate the age at which their child began to struggle with reading – the characteristics of children of parents who did not report age-of-identification might have been qualitatively difference than those of parents who did report this. Future studies may overcome this problem by having age-of-identification data collected at an early age in order to more accurately acquire this information, or to access school records to obtain objective indicators of age-of-identification.

Another possible explanation for this unexpected finding (children identified with reading difficulties at a younger age were more likely to report internalizing patterns) lies in the use of self-report rather than parent-report data. In a review of previous research, De and Kazdin (2005) reported that a variety of factors can lead to significant differences between parent and self-report in ratings of internalizing and externalizing patterns. For instance, discrepancies may decrease as the child ages (with self-ratings becoming more similar to parent-ratings) because he/she may become more self-aware of their problem behaviour. However discrepancies between child and parent reports of internalizing patterns may also increase as children become more self-aware of their internal thoughts and feelings which may not be obvious to parents (2005). Internalizing symptoms can often go unnoticed in children because these symptoms generally do not impact others around the person experiencing the internalizing symptoms.

Finally, a more interesting explanation may be rooted in the development of socio-emotional adjustment symptoms in children over the course of time. It is possible that children who are identified earlier with reading difficulties experience externalizing symptoms at an earlier age but then drop these while developing internalizing symptoms as they grow older. Leeuwis and colleagues (2015) found that children's internalizing patterns were predicted by a combination of damaged self-esteem and

victimization. The authors found that children with high self-expectations and low performance reality (together leading to damaged self-esteem) were more likely to experience victimization and show internalizing patterns as they aged (2015). It is possible that children with reading difficulties reflect similar patterns of self-esteem damage and experience victimization in school for their poor reading performance; this then could result in increased internalizing patterns related to reading experiences. It is plausible that children experiencing reading difficulties at a younger age may be exposed to victimization for longer periods of time due to the fact that they experience more reading failures over time than do later-identified children. This extended victimization may leave them more vulnerable to developing internalizing patterns than children who are not identified with reading difficulties until later in their academic careers.

Coping Hypotheses

Another hypothesis examined in this study was that children's coping strategy would be related to their age-of-identification in a particular way. This was partially supported in that children who were identified later with reading difficulties did report more use of disengagement coping strategies. These hypotheses were based on literature showing that disengagement coping strategies develop later in childhood after the development of primary coping strategies (Babb et al., 2010; Compas et al., 2001; Rothbaum et al., 1982) and that repeated use of a strategy can lead to continued/habitual use of the strategy as explained by the social-information processing model (Crick, & Dodge, 1994).

This finding is in keeping with Sontag and colleagues' findings (2008) showing that older girls were less likely to report use adaptive strategies, but instead reported the use of involuntary disengagement strategies. Furthermore, Hampel and Petermann (2005) considered the differences in coping strategy of children based on age, gender, and situational aspects. These authors 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 (2005). 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 these across a variety of stressors.

Considering that the late-identified group in the current study likely did not have to deal with the stress of reading poorly until they were older, it is possible that they used disengagement coping strategies across many stressful situations as suggested by Hampel and Petermann (2005). It follows then that the earlier identified group would not show the same level of disengagement coping strategy-use, despite being the same age at the time that they completed the questionnaire. These children likely had been dealing with the stress of reading from an early age, so they had the experience of applying disengagement coping strategies to a more restricted set of stressful situations as suggested by Hampel and Petermann (2005). Rather than increase their use of disengagement coping strategies as they aged, these earl-identified participants may have continued to apply these strategies within situation-specific contexts related to reading, possibly because of the practice-effects described by Crick and Dodge (1994).

Gender Differences

Consistent with previous research, the results indicated that girls were more likely than boys to report using disengagement coping (Babb et al., 2010; Compas et al., 2001; Hampel & Petermann, 2005). One surprising finding was that there were no significant differences found between boys and girls. Typically, research involving both boys and girls finds significant gender differences when considering socio-emotional adjustment (Whitcomb & Merrell, 2013; Willcutt, & Pennington, 2000; Leeuwis et al., 2015). Typically, studies find that girls are more likely to display internalizing patterns, and that boys are more likely to show externalizing patterns (Whitcomb & Merrell, 2013). While the gender difference of socio-emotional adjustment in this study was only marginally significant, it reflected the opposite findings – namely, that girls were more likely than boys to endorse externalizing

patterns on the SDQ. Because this finding was marginally significant ($p = 0.055$) it is possible that this finding was due to chance.

Reading Findings

In comparison to other samples of participants with reading difficulties this sample's mean score may appear elevated due to the nature of the measure used. The TOWRE-2 measures sight word knowledge, phonetic decoding efficiency, and fluency without measuring comprehension; it is therefore possible that students who participated and were identified as poor readers may have average to superior phonetic decoding abilities but be seen as a struggling reader due to comprehension issues.

Limitations in Measurement

Although the SDQ has been used in previous research and "has repeatedly been identified as a measure with strong psychometric and theoretical construct properties" (Morgan, Farkas, & Wu, 2012, p. 365), it is concerning that published reliability and validity scores were not available. However, split half reliability, using the current sample's scores, indicated that this measure is highly reliable (Spearman-Brown coefficient = 0.947). While the measure may be reliable, the validity of the measure to assess socio-emotional adjustment remains under question.

When examining the individual questions of the SDQ in comparison to the BASC-2 PRS questions, it is obvious that the focus of each is different. The BASC-2 PRS includes questions only related to the child's behaviour that might indicate behavioural or emotional concerns whereas the SDQ includes additional questions related to the child's self-perceived ability at school and preference of school subjects. This difference in conceptual focus may account for some of the results obtained. It is possible that a different self-report measure, such as the Beck Youth Inventories (Beck, Beck, & Jolly, 201), may have resulted in children's self-report scores that reflect conceptually different aspects of internalizing and externalizing patterns. Asking about feelings towards school and perception of ability in math and reading in addition to asking about these social and emotional issues may have affected

children's self-reflection of their own behaviours and emotions which pertain to internalizing and externalizing patterns.

This concern was to be addressed by balancing the findings of the self-report measure against the findings from the BASC-2 PRS measure. Unfortunately, fewer parents than expected completed this measure, so comparisons were difficult to make. In addition, the comparisons would also bring to light the issue of self vs. other report of internalizing and externalizing patterns. Especially with children, it can be difficult to compare reports from the child and the parent because each may have a different focus or even understanding of the child's behaviours. For instance, internalizing patterns are less noticeable to others than are externalizing patterns; it is not uncommon for parents to rate lower internalizing patterns than the child does simply because the parents are not able to know the thoughts or feelings the child experiences, especially if internalizing patterns are not expressed with outward behaviours like crying. In addition, some children may not recognize or be willing to report their externalizing patterns at the rate that their parents might. Children may not recognize their actions as aggressive or realize the extent to which they are inattentive, whereas an outside observer such as a parent may be more likely to be able to report on these visible behaviours.

Finally, with regard to the coping measure, it is important to note that this was the first use of the RSQ reading stress and coping strategy measure. Therefore, this measure may require adjustments in order to ensure that it reliably and validly measures the targets.

Future Research and Conclusion

As is the case with all research, this project could not consider every aspect or variable that could have influenced the results and contribute to a better understanding of reading difficulties, coping strategies, and socio-emotional adjustment. Morgan and colleagues (2009; 2012) highlight the importance of the autoregressor as a predictor of later socio-emotional adjustment outcomes. Future research on this topic should include information about previous socio-emotional adjustment of

participants. Furthermore, longitudinal studies would provide a host of valuable information to illuminate our understanding of the development of stress in children with reading difficulties, their coping strategies, and socio-emotional adjustment.

As mentioned above, future studies may wish to consider a different approach to obtaining retrospective data from parent questionnaires. For instance, relying on parent memory can be problematic especially when asking parents to remember information from up to 5 years prior. In addition, many parents in the current study did not complete all of the questions resulting in missing data and mandatory exclusion of some participant data. Future studies would do well to revise their questionnaires to be clearer, shorter, and to provide more incentive for parents to complete the study.

This study highlighted the importance of the age-of-identification of reading difficulties on children's socio-emotional adjustment outcomes. Results showed a number of interesting relationships amongst age-of-identification, socio-emotional adjustment, and coping style. Educators and other school support staff may consider the findings of this study when developing programming for children with reading difficulties in school: specifically, in addition to developing programming to address academic reading concerns, it is also important to consider how to support these students' social and emotional needs at school. The findings of this study suggest that students who have experienced reading difficulties from an early age show later signs of internalizing patterns like anxiety and depression. Teachers and other school staff can help support these students' needs by making themselves aware of these kinds of patterns to better notice them in students. Incorporating such information in classrooms may be especially important because of the nature of internalizing patterns. Because it can be difficult to notice signs of internalizing patterns, providing continued education to school staff about mental health and coping, emphasizing that individual differences in reading ability are common may be beneficial to students who do not outwardly appear as though they are experiencing internalizing patterns.

Continued research on the relationship of age of identification of reading difficulties, socio-emotional adjustment and coping strategies will help resolve current theoretical debates about discrepant patterns between reading difficulties and socio-emotional adjustment. Children of different ages have unique resources to draw upon in coping with academic failure related to reading and show different patterns of socio-emotional adjustment. Learning more about how these difference in resources that are available at different ages influence socio-emotional adjustment in children with reading difficulty will help educators better serve students with reading difficulties to learn to read and concurrently promote healthy socio-emotional adjustment.

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Table 1 Whole Sample Descriptive Statistics

Participant Category	Number	Mean TOWRE-2 Score (SE)
Early Identified	18	75.72(3.33)
Late Identified	18	85.50(4.66)
Male	18	83.11(4.11)
Female	18	78.11(4.23)
9 years old	2	57.50 (0.5)
10 years old	15	86.27 (4.44)
11 years old	17	80.12 (4.16)
12 years old	2	65.50 (1.50)

Table 2 Age-of-Identification Group Differences (*M, SE*)

Variable	Early	Late	*p-value*
RSQ Mean Stress	2.37 (0.17)	2.36 (0.17)	0.983
Primary Coping	0.17 (0.01)	0.16 (0.01)	0.539
Secondary Coping	0.23 (0.01)	0.25 (0.01)	0.264
Disengagement Coping	0.14 (0.00)	0.17 (0.01)	0.015*
SDQ Externalizing	2.54 (0.10)	2.23 (0.12)	0.051
SDQ Internalizing	2.60 (0.11)	2.19 (0.12)	0.017*
WASI-II FSIQ	93.00 (3.04)	85.80 (2.08)	0.051
TOWRE-2	75.72 (3.33)	85.50 (4.66)	0.098
BASC-2 PRS Externalizing	56.20 (3.02)	50.17 (2.46)	0.138
BASC-2 PRS Internalizing	55.69 (2.68)	53.25 (3.16)	0.560

Table 3 Pearson Correlations

Variable	1	2	3	4	5	6	7	8	9
1. Age	-								
2. TOWRE-2	-.05	-							
3. IQ	-.11	.14	-						
4. RSQ Primary	-.04	.10	-.10	-					
5. RSQ Secondary Coping	.22	.18	-.13	.52**	-				
6. BASC-2 Externalizing	.06	-.41*	.04	-.13	-.24	-			
7. BASC-2 Internalizing	.27	.10	.36	-.19	.10	.32	-		
8. SDQ Internalizing	-.05	-.08	.06	.10	-.39	.01	-.26	-	
9. SDQ Externalizing	.20	.13	.06	.03	-.20	.02	.24	.30	-

Note: * Indicates significance at $p < 0.05$. ** Indicates significance at $p < 0.01$.
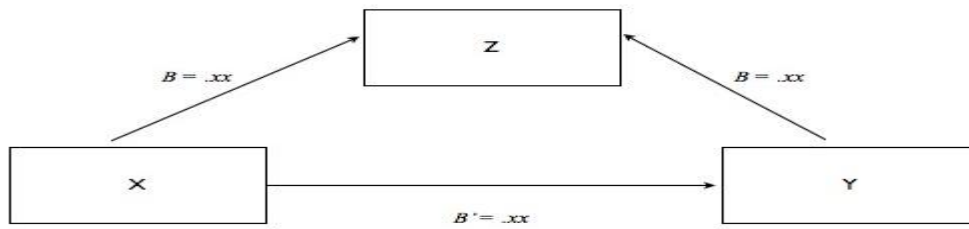
Figure 1. Mediation Model – All arrows indicate correlations which must be significant for mediation analyses.

Appendix A: Participant Information Questionnaire

Participant Information Questionnaire (to be attached to Parent/Guardian consent form)

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: _____

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

Extremely often   Often   Sometimes   Not often   Never

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: _____

Done ☺

Appendix B: RSQ

RESPONSES TO STRESS QUESTIONNAIRE

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.	1	2	3	4

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 1	A little 2	Some 3	A lot 4
1. I try not to feel anything.	1	2	3	4
2. When dealing with the stress of reading problems, I feel sick to my stomach or get headaches.	1	2	3	4

Circle the response that shows how much you agree with the statement	Not at all 1	A little 2	Some 3	A lot 4
3. I try to think of different ways to change or fix the situation.	1	2	3	4
4. When reading problems happen, I don't feel anything at all, it's like I have no feelings.	1	2	3	4
5. I wish that I were stronger and less sensitive so that things would be different.	1	2	3	4
6. I keep remembering what happened with reading problems or can't stop thinking about what might happen.	1	2	3	4
7. I let someone or something know how I feel. (ex. parent, friend, or stuffed animal)	1	2	3	4
8. I decide I'm okay the way I am, even though I'm not perfect.	1	2	3	4
9. When I'm around other people I act like my reading problems never happened.	1	2	3	4
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 having of 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
Circle the response that shows how much you agree with the statement	Not at all 1	A little 2	Some 3	A lot 4
18. I 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	1	2	3	4

music, or punching a pillow)				
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
Circle the response that shows how much you agree with the statement	Not at all 1	A little 2	Some 3	A lot 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, 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	1	2	3	4

reading problems.				
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 problems, I get upset by things that don't usually bother me.	1	2	3	4

Circle the response that shows how much you agree with the statement	Not at all 1	A little 2	Some 3	A lot 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 upset that I can't remember what happened or what I did.	1	2	3	4
56. I try to believe that it never happened	1	2	3	4

	1	2	3	4
57. When I am dealing with the stress of reading problems, sometimes I can't control what I do or say.				

Appendix C: SDQ
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 1	A Little True 2	Some-What True 3	Very True 4
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
Circle the response that shows how much you agree with the statement	Not at all true 1	A little true 2	Some-what true 3	Very true 4
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

	Not at all true 1	A little true 2	Some-what true 3	Very true 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
Circle the response that shows how much you agree with the statement	Not at all true 1	A little true 2	Some-what true 3	Very true 4
41. I am good at math	1	2	3	4
42. I get good grades in all school subjects	1	2	3	4