

An Examination of a Reading Intervention Provided to Youth Involved in a Crime Prevention

Program

by

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Abstract

The current study examined aspects of delivering a reading remediation program to students with reading difficulties who were involved in the Youth Advocate Program (YAP). This program targets youth who are at risk for engaging in gang activities, anti-social conduct, and criminal behaviour. Of the 44 youth entering the YAP over a 5 year period and who were referred for a reading assessment, 38 showed reading difficulties. It was thus estimated that approximately 63% of the youth entering the YAP have significant difficulties in the area of reading. Twelve students from the YAP program and 12 age and reading-matched comparison students participated in the reading intervention which was the first part of the SpellRead program (approximately 40 hours). Following the intervention, both groups showed reliable and academically meaningful improvement in all areas of reading, including phonological awareness, word recognition, fluency, and comprehension. There were no differences between the two groups on pre- and post-test reading measures with the exception of reading comprehension. The comparison group was significantly higher on the reading comprehension measure; however, both groups' reading comprehension performance benefitted equally from the intervention. Although students completed only the first part of this reading intervention, statistically reliable and academically meaningful improvements were seen in all reading skills.

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Strong literacy skills are needed in order to be successful in today's society. In Canada, it has been reported that 28% of adults (12 million Canadians aged 16 and over) perform below the literacy skill level needed to thrive in today's world (Human Resources and Skills Development Canada and Statistics Canada, 2003). Individuals with poor literacy skills are more likely to be unemployed, work in lower-paying jobs and live in low-income households (CCSD, 1998). For example, the unemployment rate for individuals with low levels of literacy is reported to be over six times the unemployment rate for individuals with high literacy skills (Statistics Canada, 1996). Individuals' income levels correlate with literacy skills. On average, an individual with higher literacy skills will make an extra \$585 000 - \$683 000 over a lifetime, compared to someone with low literacy skills (Conference Board of Canada, 1997).

A population greatly affected by low literacy skills is incarcerated individuals. Fifty-five percent of those in prison in Nova Scotia are reported to have language and math skills at less than a grade 10 level (Literacy Nova Scotia, 2003). In addition, it was found that 62% of adult offenders had not completed high school (Landry, 2012). In a U.S. study, Brunner (1993) found that on average, incarcerated youth were reading at a grade four level and more than one third were illiterate, unable to read or write.

The current study examined aspects of delivering a reading remediation program to students with reading difficulties who are involved in the Youth Advocate Program (YAP), a project that targets youth who are at risk of engaging in gang activities, anti-social and criminal behavior. In order to situate the current study in the research literature, several areas will be reviewed. Initially risk factors for reading difficulties, such as low socioeconomic status or poor

phonological awareness skills will be discussed. This is followed by a review of the literature on reading interventions for younger and older students with reading difficulties. Finally, the research is reviewed on reading interventions used for high-risk or criminal youth.

Early Risk-Factors, Reading Acquisition, and Intervention

Previous research has established a relationship between a family's socioeconomic status (SES) and children's reading achievement. Vocabulary abilities that are related to reading and literacy are strongly associated with socioeconomic indicators. Children from low-income families obtain significantly lower scores on measures of reading achievement, than those obtained by children with higher-income families (Dickinson & Snow, 1987; Jantz, 1987; Nicholson & Gallienne, 1995; Pungello, Kupersmidt, Burchinal, & Patterson, 1996). In addition, low-income families have a higher proportion of children at risk for reading failure, and in poor families, literacy deficits tend not to improve across generations (Snow, Barnes, Chandler, Goodman, & Hemphill, 1991). Conversely, children coming from high-socioeconomic status families typically have high verbal abilities and are more likely to experience positive academic outcomes (D'Angiulli, Siegel, & Hertzman, 2004). Several studies indicate that training focused on reading and phonological processing skills can be used with young children before reading failure might take place to compensate for socioeconomic disadvantages in reading skills (Lonigan et al., 1999; Lundberg, Frost, & Petersen, 1988; Vadasy, Jenkins, & Pool, 2000).

D'Angiulli and colleagues' (2004) longitudinal study contributed to the growing research which suggests that schooling may attenuate the association between SES and children's reading achievement (see also Gersten, Becker, Heiry, and White, 1984). Students in kindergarten through to grade three from 30 elementary schools in the North Vancouver district participated (N=1221) in this study. Students who scored below the 25th percentile on a word reading test

(WRAT3; Wilkinson, 1993) were considered to be at-risk for reading failure. Reading instruction over the elementary school years included a focus on phonemic awareness and decoding (the process of translating a printed word into sound) in the earliest grades, along with comprehension strategy instruction and a literacy-rich environment throughout elementary school. Children not gaining sufficient phonological awareness and word recognition in the early grades received more intense instruction in these domains. At study onset, mean achievement scores for students in each grade were correlated with mean socioeconomic indicators obtained from a recent census that was conducted by Statistics Canada covering the school neighbourhood areas. The socioeconomic indicators used were unemployment, mobility, single parent status, and income (D'Angiulli et al., 2004).

With this intensive school-based literacy program the significant association between SES and literacy-related skills in kindergarten declined to non-significant levels by grade three. Reductions of socioeconomic effects were noted as early as six months after starting the literacy program. The risk and prevalence of reading failure also decreased with more schooling. For example, the risk of reading failure in kindergarten of .26 was reduced to approximately .04 in grade three. It was also noted that the risk of reading failure in kindergarten decreased as SES increased; again demonstrating that individuals with a higher SES are less at risk of reading failure than individuals with a lower SES (D'Angiulli et al., 2004). Children living in families at the lower end of the socioeconomic spectrum may be more vulnerable to reading failure as they may not receive sufficient “transitional” instruction at home, such as learning the sound and written structure of language before starting kindergarten (see also D'Angiulli, Siegel, & Maggi, 2004).

With a similar approach, Linan-Thompson and Hickman-Davis (2002) examined the effectiveness of an intervention in grade-two classrooms which included intensive, explicit, and systematic reading instruction for 30 minutes per day, with an emphasis on phonemic awareness, fluency and word reading. The intervention was effective at improving reading skills in low-SES students. According to Hagans-Murillo (2001) SES differences in reading achievement may be explained by differences in phonological awareness skills. Therefore, Hagans-Murillo (2001) examined the effectiveness of a phonological awareness skills intervention on the reading achievement of 50 first-grade students from low-SES. Students were randomly assigned to an intervention group (instruction in phonological awareness) or a control group (beginning math skills) over a 10 week period. There were also 25 students from middle-to-high-SES backgrounds who served as a comparison group. The results indicated that the students from low-SES in the phonological awareness intervention group increased their phonological awareness skills in comparison to the low-SES students in the control group, and had comparable phonological awareness skills to the middle-high-SES students. The results demonstrated that instruction in phonological awareness can mediate SES differences in young children's phonological awareness skills (Hagans-Murillo, 2001).

Lesaux and Siegel (2003) conducted a longitudinal study on preventing reading difficulties in school children, including children who spoke English as a second language (ESL). Participants were 978 (790 English as first language (L1) and 188 ESL) children who completed standardized and experimental measures of reading, spelling, phonological processing, and memory, pre- and post-intervention. Each participant received phonological awareness instruction in kindergarten and phonics instruction in grade 1 as components of a school-based, literacy-rich program. In kindergarten, 23.80% of the L1 children and 37.20% of

the ESL children were identified as at risk for reading failure. In grade 2, 4.20% of the L1 children and 3.72% of the ESL children were identified as reading disabled. The results of the study demonstrated that at the end of the longitudinal study (end of grade 2), the ESL student's reading skills were equivalent to those of the L1 students, and the ESL students even outperformed L1 students on several measures. A complete literacy program with explicit instruction in phonological awareness and phonics was as effective for ESL children and acted to alleviate this risk-factor for reading failure (Lesaux and Siegel, 2003).

In summary, having a low socioeconomic background and having English as a second language are risk factors for reading difficulties. Effective early prevention has the following components, which are effective even with populations with these risk factors: instruction in phonological awareness, phonics, comprehension strategies and a literature-rich classroom program. The current study addressed older students with reading difficulties, 9-14 years of age. It is therefore important to also examine the research on interventions for older children.

Reading interventions for older children

Reading difficulties in junior high and the high school years can be quite devastating for an individual student. Previous reading strategies may have little value as texts and literacy demands increase and become more complex in junior high and high school (Greene, 1996). Greene (1996) pointed out that more research was needed in the area of successful reading interventions for older students with reading difficulties. Rashotte, MacPhee and Torgesen (2001) set out to determine the effectiveness of a phonologically-based reading program (The SpellRead Program), delivered to 115 poor readers in grades one to six, over an eight week period. Student's ranged in age from 6-12-years-old and the school population included a high proportion of families considered economically disadvantaged and with low levels of adult

literacy. Reading scores for the school were below average for the school district and below national standards; 68% of the students were not reading at grade level on the studies' standardized instruments. The participants were randomly divided into two groups; the treatment group received the SpellRead program for the first phase of the study while the wait-list comparison group continued to receive regular classroom reading instruction. The intervention was delivered to small groups of three to five children. The students' reading ability was measured before and after the intervention was administered to both the treatment and the wait-list comparison group. The test battery included measures that assessed phonological awareness, word level reading (word, text reading, and phonetic decoding accuracy), fluency, comprehension, spelling and verbal ability (Rashotte et al., 2001).

The results of the study indicated that following the first phase of the reading intervention, 35 hours of instruction, the treatment group performed significantly better than the wait-list comparison group on phonological awareness, decoding, comprehension and spelling. Reading fluency, as measured by isolated word and text fluency measures were normalized for the Grade 1 and 2 students, and showed some improvement for Grade 3 and 4 students. The mean word and text fluency scores for the Grade 5 and 6 students remained below the 25th percentile after the intervention and did not differ from the wait-list comparison group. Following the second phase of reading intervention, there were no significant differences between the reading skills of the treatment and the wait-list comparison group, indicating that the wait-list comparison group demonstrated similar growth in their reading abilities following the completion of the reading intervention. One of the main implications of the results of this study was that a small group delivered reading instruction program can be successful in a low SES school, with a large group of students in need, and can be effective for children beyond the

earliest elementary grades (Rashotte et al., 2001; see also, Blachman et al., 1999; Dion et al., 2010).

Although intervention studies with older students with reading difficulties show impressive gains (for summary see Torgesen, 2006); fluency scores may remain far below average levels. Torgesen and colleagues (2001) studied a group of 60 eight-to-ten-year-old students with severe reading disabilities, who were randomly assigned to two different intervention programs which both focused on instruction in phonemic awareness and phonemic decoding skills. The students received 67.5 hours of one-on-one instruction in two 50 minute sessions per day, for eight weeks. Both programs demonstrated improvements in reading accuracy and comprehension and improvements were stable and in the average range over a two year follow-up period. Measures of reading rate (fluency), however, showed continued severe impairment for most of the children regardless of the fact that one intervention program spent 5% of their time reading connected text, and the second intervention program spent 50% of their time reading connected text. Torgesen (2006) suggested that the problem with improving reading fluency may not be with the interventions themselves and suggested that it may be the lack of reading practice over time that is the obstacle to improving reading fluency for samples of older children with reading disabilities.

Vaughn and colleagues (2010) examined the effectiveness of a year-long Tier 2 intervention program with a group of sixth-grade students. These students were divided into two groups: struggling readers ($n = 759$) or typical readers ($n = 1275$). Struggling readers were defined as those students who scored below a cut off score on the Texas Assessment of Knowledge and Skills (a state reading achievement test). The 759 struggling readers were randomly assigned to either the Tier 2 intervention ($n = 506$) or a comparison group receiving

regular classroom instruction ($n = 253$). Of the struggling readers, 52% percent of the sample was female, and 79% of the sample qualified for free or reduced-cost lunch. The Tier 2 intervention emphasized phonological awareness, word recognition, vocabulary, fluency, and comprehension. Students who received Tier 2 intervention performed better than the comparison group on several measures, including word attack, spelling, comprehension, and phonemic decoding efficiency (pseudoword fluency). In most cases, gains were small and were more apparent in particular subgroups of students (at a given site or at certain levels of pretest performance or age). A limitation of their study was that some of the control students received secondary intervention by their schools due to pressure to perform well on state achievement tests (Vaughn et al., 2010).

Lovett and Steinbach (1997) examined the effectiveness of two separate word identification training programs on 122 severely reading disabled children between the grades of two and six. One program focused on direct instruction of phonological analysis and blending skills. The other program taught children how to use four metacognitive word-decoding strategies. The results indicated that both programs were associated with significant gains in word identification and word attack skills in comparison to the control group, regardless of the students' grade. It should be noted that mean scores on standardized reading measures did not move into the average range on post-intervention measures. The authors suggested that the phonological deficits associated with reading disabilities are amenable and there is no evidence of a developmental window beyond which phonological deficits cannot be effectively remediated with intensive phonological training (Lovett & Steinbach, 1997). It should be noted, however, that fluency skills were not measured in this study.

The effectiveness of interventions for students in high school is less well understood. Lovett, Lacerenza, De Palma, & Frijters (2012) set out to investigate whether phonologically-based decoding skills were still amenable to intervention in adolescence and they also examined if remediation in these skills was associated with improved word reading, fluency and comprehension. The participants included 268 high school students in the intervention group and 83 high school students in the waitlist control group who met their criteria for a reading disability (187 males and 164 females with a mean age of 14.7 years). The participants represented different socioeconomic & cultural backgrounds, and primary languages (45.60% English language learners (ELL). To qualify for participation, students had to score one standard deviation or more below age norm expectations on the averaged standard score (≤ 85) obtained from three of four reading achievement tests (Lovett et al., 2012).

The intervention used was the PHAST PACES program, which focused on teaching word identification strategies, including phonological decoding, knowledge of text structures, and reading comprehension strategies. Students in this study completed 60 to 70 hours of the complete 80 hour program, over one semester. Results showed that students with reading difficulties demonstrated significant gains on most experimental and standardized reading measures compared to waitlist controls. Overall, the average standard scores of the treatment group did not come to within the average range of performance. These students then continued to have significant struggles with reading skills. Results indicated that those students who had stronger receptive vocabulary and phonological blending skills at entry were associated with higher final status on a majority of reading outcomes, and those students who demonstrated lower phonological blending skills at entry were associated with greater growth on the experimental measures. Overall, this study demonstrated that a relatively short-term intervention

can improve phonological processing and decoding skills in high school students; however, the authors concluded that more than one semester of intervention would be required to consolidate the word identification and comprehension gains and move into the average range (Lovett et al., 2012).

One limitation to the current literature on reading interventions for older students with reading difficulties is that most studies either do not report standard scores and/or how many participants have scores in the average range on post-intervention reading measures (e.g., Rashotte et al., 2001; Vaughn et al., 2010; Lovett et al., 2012). A strength of the current literature on reading interventions for older students with reading difficulties is the use of a well-matched comparison group (Rashotte et al., 2001; Vaughn et al., 2010).

In summary, research suggests that it is not too late to address basic reading skill deficits in older students with reading difficulties. The phonological deficits associated with reading disabilities are amenable to remediation; however, fluency skills are more difficult and less likely to remediate in older students with reading difficulties and these skills remain far below average levels, possibly due to a lack of reading practice over time. The current study focused on older students with reading difficulties in a crime prevention program. It is thus important to examine the research on reading interventions used for high-risk or criminal youth.

Reading interventions for high-risk or criminal youth

Much research has addressed the many risk factors that contribute to delinquent behaviour and incarceration in youth. These risk factors have been categorized as either internal (e.g., concentration problems, restlessness, risk taking, antisocial behavior, cognitive deficits, and academic difficulties, particularly in reading) or external (e.g., issues involving family, community, peer relations, and school) (Catalano, Loeber, & McKinney, 1999; Dobbin &

Gatowski, 1996; Dodge, 1999; Hawkins et al., 2000; Loeber & Farrington, 2000). The more risk factors a youth is exposed to, the more likely that they will become involved in the juvenile justice system (Christle & Yell, 2008).

Previous research has demonstrated a strong relationship between academic failure (particularly reading difficulties) and delinquency (e.g., Drakeford, 2002; Leone et al., 2005; Malmgren & Leone, 2000). Poor academic skills, mainly in reading, have not been proposed to directly cause delinquency and incarceration; however, youths with poor academic skills are disproportionately found in the criminal justice system (Centre on Crime, Communities & Culture, 1997). It has been proposed that when students do not learn to read in elementary school, it can lead to an increase in frustration and school failure and therefore lead to a greater risk in developing maladaptive and aggressive behaviors (Christle & Yell, 2008). Overall, in terms of academic skills, incarcerated youth are found to be at least one to several years below grade level expectancies (for review see Foley, 2001).

Previous research has found internal protective factors against probability of future delinquency, such as self-control, goal setting, high self-esteem, and social and cognitive competence. The greatest contributor to internal protective factors is cognitive competence, more particularly language functioning and the ability to read (for review see Christle & Yell, 2008). A student's self-efficacy and behaviour improves when they are able to read and experience success in school, therefore strategies that encourage academic success aid protective factors against delinquency (Christle & Yell, 2008). External protective factors against delinquency involve the following three categories: caring relationships, positive and high expectations, and opportunities for meaningful participation within the family, in school and in social life. A community mentor or supportive friend can be used for emotional support, as well as teaching

strategies for avoiding trouble and interacting positively with others. These mentors or friends can also convey high expectations for the youth and encourage their strengths and abilities (Christle & Yell, 2008).

In order to prevent youth delinquency and incarceration, the previously discussed risk factors and protective factors must be taken into consideration. Academic failure and poor literacy skills are common in youths at-risk or involved in the juvenile justice system, thus proficient reading ability may provide a key protective factor for at-risk youth (Christle & Yell, 2008). Existing research on strategies for teaching reading to students at-risk for incarceration or those who are incarcerated is minimal; however, the research that has looked at academic skill remediation with juvenile offenders has reported some positive effects (Christle & Yell, 2008). These positive effects include not only increased academic skills, but also include reduced recidivism and increased prosocial behaviour for juvenile offenders (Archwamety & Katsiyannis, 2000; Brunner, 1993). Reading interventions are an important aspect of increasing literacy skills and may decrease criminal behaviour.

The Texas Juvenile Justice Tiered Instructional Model is a reading program recently created specifically for juvenile correction institutions (Williams, Wexler, Roberts, & Carpenter, 2011). The model involves three different tiers of instruction provided to incarcerated youth. The first tier of instruction is provided to all of the youths in the correctional institution and is the same instruction that would be provided to them if they were in a general education setting. The students who do not respond to the first tier move on to more intensive instruction in the second tier. After receiving more intensive instruction, those students who respond to the instruction will return to the first tier and those who do not respond to the instruction will continue with increasingly intensive intervention in the third tier (Williams et al., 2011).

In the Texas Juvenile Justice Tiered Instructional Model, the intervention used in tier II for reading is the REWARDS program (Archer, Gleason, & Vachon, 2005a), which teaches flexible word decoding strategies appropriate for older students with reading difficulties. The REWARDS program focuses on strategies for decoding multi-syllabic words. Additionally, students are also taught multi-step reading comprehension strategies using the REWARDS Plus program (Archer, Gleason, & Vachon, 2005b) and a modified version of Collaborative Strategic Reading (Klingner et al., 2001). Throughout the length of the program, student data is collected to monitor progress as well as to identify skills that are still weak. Those students who qualify for tier-III often demonstrate a reading level below the tenth percentile and would not benefit from the REWARDS program as they do not demonstrate basic phonemic decoding skills; therefore, the instruction at the tier-III level is intense and individualized to the student's needs (Williams et al., 2011). Although the tiered system described appears to be promising, there are no reported research findings at this time.

Previous researchers have noted many challenges of conducting a reading remediation program within a juvenile correctional institution (Krezmien & Mulcahy, 2008). First, disciplinary and treatment concerns often trump educational needs in a correctional education setting (Williams et al., 2011). Second, due to disciplinary consequences and treatment concerns being the priority in the correctional institution, students rarely complete five days of consecutive instruction, thus requiring the teachers to spend a lot of extra time re-teaching the lessons and helping students catch up who have missed instructional time. The authors noted that in order to implement a reading remediation program in a juvenile correctional institution, it is important to have support from administration in order to make educational needs equally important as disciplinary and treatment concerns (Williams et al., 2011).

In 1996, Greene examined an intervention which provided an individualized structured language curriculum (LANGUAGE!) to adjudicated youth with significant delays in reading, writing composition and spelling. Participants in this study included adjudicated youth who had been assigned to Associated Marine Institute programs in the United States which focused on vocational, social-emotional, and educational rehabilitation of juvenile offenders. Participant's ages ranged from 13- to 17-years-old. There were 45 participants in the treatment group (43 males, 2 females) and 51 participants in the comparison group (48 males, 3 females). The LANGUAGE! curriculum is an alternative to the mainstream curriculum and is composed of 54 sequential and cumulative units. Each of the 54 units deal directly with reading instruction, such as phonemic awareness, decoding isolated words, and reading sentences, paragraphs, and passages for meaning (Greene, 1996). After participating an average of 23 weeks in the curriculum, the pre- and post-measures documented that participants made significant gains in comparison to the control group in written composition, spelling, and isolated word recognition. Standardized scores at pre-test which were in the 60s and 70s, improved to scores in the 80s and 90s on post-test reading measures (Greene, 1996).

Malmgren and Leone (2000) examined the effects of a short-term reading remediation program in the juvenile justice system. There were 45 incarcerated African American male participants in the study with an average age of 17 years. The researchers used the Corrective Reading program (Englemann et al., 1999), an evidence-based program that supports decoding and fluency skills among older students with reading difficulties and combines direct instruction in decoding, fluency-building activities, and comprehension instruction. The intervention was completed during the student's summer break from regular instruction and it was conducted for approximately three hours per day, five days per week, for six weeks. The authors reported

significant pre- to post-test gains in reading rate and accuracy as measured on a standardized test. The researchers concluded that specific reading skills of low-achieving incarcerated juveniles can be significantly improved over a short but intensive period of intervention. Overall, the participant's mean reading scores remained well-below grade level after the intervention; however, with reliable gains made over a short period of time, it was recommended that literacy instruction be on-going throughout the year in correctional education programs. This is considered to be essential in order to make a functional difference in the lives of incarcerated youth (Malmgren & Leone, 2000).

Drakeford (2002) extended the Malmgren and Leone (2000) findings, using a multiple-baseline design across participants to examine the effectiveness of the Corrective Reading program on the oral reading fluency of six incarcerated African American males with a mean age of 17 years. According to pre-intervention assessment, each participant entered the study with reading scores at or below the 25th percentile on tests of word recognition. The students received one-on-one instruction from trained undergraduate interns in an evening literacy program for 60 minutes per day, three times a week, for 10 weeks. The Corrective Reading program focused on decoding and comprehension. During a typical lesson, each student worked on specific skills such as sounding out words and letters, letter identification and general decoding strategies (Drakeford, 2002).

The student's oral reading rates were measured using daily timed readings of grade-level passages. The students were divided into two groups and baseline measures were taken. It was noted that oral fluency rates remained stable during baseline without intervention for both groups and that oral fluency rates improved after intervention was implemented for both groups. All participants improved from half a grade to a full reading grade level post-intervention. The

researcher concluded that short-term intensive reading remediation can have a positive effect on the oral reading rates of youth involved in the juvenile justice system (Drakeford, 2002).

There are several limitations to the current literature on reading interventions for juvenile offenders. First and foremost, the majority of the previous literature has been completed in the United States (e.g., Williams et al., 2011; Greene, 1996). There are limited Canadian studies available, and no research that we know of, to date, coming from the Atlantic Provinces. As well, most research on reading interventions for juvenile delinquents focus on incarcerated youth (e.g., Williams et al., 2011; Greene, 1996; Malmgren & Leone, 2000; Drakeford, 2002) whereas the current study focused on youth at-risk for gang involvement and criminal behaviour. One of the major limitations of the current literature is that most studies do not report standard scores and how many participants move into the average range on post-intervention measures (e.g., Greene, 1996; Drakeford, 2002). In reading intervention research, it is important to be able to understand how much of a gain can be achieved post-intervention. A final limitation of an isolated study include that they did not have a comparison group to demonstrate whether or not growth in reading would have occurred regardless of the intervention provided (Malmgren & Leone, 2000). Some strengths of isolated studies on reading interventions for juvenile offenders are the use of a multiple baseline design (Drakeford, 2002) and the examination of standard scores to determine the level of reading scores at post-intervention (Malmgren & Leone, 2000).

In summary, previous research has demonstrated a high proportion of difficulties in youth at-risk or involved in criminal behaviour. There is a lack of research on strategies for teaching reading to students at-risk for criminal activity; however, the research that has looked at reading skill remediation with juvenile offenders has reported some positive effects. These positive effects include not only increased reading skills, but also include reduced recidivism and

increased prosocial behaviour for juvenile offenders (Archwamety & Katsiyannis, 2000; Brunner, 1993). Reading interventions appear to be an important aspect of increasing literacy skills and decreasing criminal behaviour.

Current study

The current study examined aspects of delivering a reading remediation program to older students with reading difficulties who were involved in the Youth Advocate Program (YAP), a project initiated in six Halifax Regional Municipality communities that targeted youth 9-14 years of age who are at risk of engaging in gang activities, anti-social conduct, and criminal behavior. The youth accepted into the YAP must reside in one of six pre-determined high-risk communities (Dartmouth North, Woodside/Gaston Road, Dartmouth East, Spryfield, Bayers-Westwood and Fairview, and Uniacke Square plus surrounding area). These communities were identified by the Halifax Regional Police, based on known gang-activity. The youth must also show a minimum of three risk factors upon being referred. The risk factor checklist included the following items: alcohol or drug use, frequently in trouble with the law/involved in criminal activity, high commitment to friends involved in criminal activity, friends/family members are gang members, conflict between home and school life, gangs in and around school/neighborhood, lack of adult role models, parental criminality/violent attitudes, and siblings with anti-social behaviors. Each youth accepted into the program was assigned a Youth Advocate Worker who is the primary source of support for the youth and his/her family for the duration of the YAP. In 2009 alone, the Youth Advocate Workers collaborated with 25 different non-profit, private, and government organizations to support the program and its participants, including a partnership with the Halifax Learning Centre.

The theoretical foundation of the YAP is based on the Wraparound model (VanDenBerg & Grealish, 1996), a model which takes a prevention-oriented approach to intervention. Wraparound models provide a set of supports to individuals and their families within their communities. Some elements of a Wraparound model include: putting people and their individual needs first, focusing on the family as a whole system, and involving the individual in their own case planning; (VanDenBerg & VanDenBerg, 2005).

The YAP is designed to include some elements of intervention found in similar models as well as some elements not typically found in community-oriented interventions. For example, intervention with at-risk youth within their own communities has been shown to be effective when the intervention is intense (usually a period of at least six weeks), when there is a small worker to client ratio, and when goals for change are clear and focused on observable behavioural adaptations (Quinn, 2004). When a Wraparound model is implemented consistently across a community, it has been shown to be effective at producing changes in cognition and behaviour amongst youth (Bruns, Suter & Leverentz-Brady, 2006).

In 2011, The Resilience Research Centre at Dalhousie University conducted a three year evaluation of the YAP in order to evaluate the structure and effectiveness of the program (Resilience Research Centre, 2001). Quantitative data was collected using the YAPST assessment tool that included validated scales for factors fundamental to the prevention of youth gang involvement. The YAPST (a self-report measure for youth) and the YAPST PMK (completed by an adult who knows the youth well) was administered during intake meetings following referral to the program. These measures were re-administered every six months and following the youths' exit from the program. The questionnaire risk scales showed that youth accepted into the program scored higher on conduct problems, delinquency, substance abuse,

normative beliefs about aggression, and attitudes toward gangs, than youth not accepted into the program and the community comparison group. At-risk youth and youth who identified as being in a gang demonstrated a trend toward a decrease in negative rushes (stimulation seeking activities associated with socially undesirable behaviours, such as, drug use, risky sexual activity and vandalism) and isolation from the initial to the exit assessments. At-risk youth and youth who identified as being in a gang also demonstrated an increased score on different behaviours associated with resilience between the initial and exit assessments (Resilience Research Centre, 2011).

As previously mentioned, the current study examined aspects of delivering a reading remediation program, the SpellRead Program, to older students with reading difficulties who have been involved in the YAP since the collaboration with The Halifax Learning Centre began in 2009. Each of five research questions were addressed. The first research question examined what proportion of youth entering the Youth Advocate Program could be categorized as having reading difficulties. While previous research estimates that approximately 30% of individuals in the general population have reading difficulties (e.g., Shaywitz, 2003), it was hypothesized that there would be a greater proportion of youth in the YAP who meet these criteria. As reviewed earlier, research suggests a higher proportion (45-65%) of reading difficulties for the population in the criminal system (Svensson, Lundberg, & Jacobson, 2001).

The second research question addressed whether the profile on reading and reading related measures collected at intake was similar across students with reading difficulties in SpellRead from the Youth Advocate Program and those that were enrolled by their families. It was hypothesized that both groups would show similar profiles. Research literature has shown that children in the general population with reading difficulties most frequently have

phonological processing deficits and that these impact all reading areas measured in this study. Similarly youth in the Youth Advocate Program were also hypothesized to have difficulties in the phonological domain that may be a result of both an inherent weakness in phonological processing as well as environmental factors (e.g., D'Angiulli et al., 2004). Supporting this hypothesis as well is previous literature on word recognition in criminal youth (Drakeford, 2002). Drakeford (2002) found that each incarcerated youth who participated in his study, entered with reading scores at or below the 25th percentile on word recognition. A competing hypothesis might be that there were never phonological deficits in youth from the YAP; word recognition skills may be relatively unimpaired in this group. Rather, prolonged experience with an impoverished language environment and lack of reading over the years may have impacted fluency and comprehension in the youth from the YAP.

The third research question examined whether the Youth Advocate Program students beginning the SpellRead program were able to see it through to completion. Given significant difficulties providing interventions to similar populations reported in the literature, it was questioned what percentage of students beginning the SpellRead program would complete the planned intervention. It was hypothesized that we may see a substantial number of the Youth Advocate Program students who didn't complete the intervention. Previous reading intervention research with delinquent youth reports difficulties with attendance (Williams et al., 2011).

The purpose of the fourth research question was to examine the effectiveness of the SpellRead program. That is, to determine if there were significant improvements between the pre- and post-treatment measures on phonological awareness, word recognition, pseudoword recognition, reading comprehension and fluency for the students from the Youth Advocate Program. Additionally, it was examined whether post-treatment measures of reading skills

moved into the average range by the end of the SpellRead instruction. It was hypothesized that there would be a significant improvement between the pre- and post-treatment measures given the research showing improvement from programs that focus on phonological awareness, word recognition instruction, as well as connected text reading. On the other hand, it was hypothesized that the scores of youth in the Youth Advocate Program may not improve enough to bring them to within the average range. Research has shown that, in general, it is harder to get the reading scores of older students with reading difficulties into the average range, although with intensive intervention most areas other than fluency can come into this range (Torgesen et al., 2001). It should be noted, however, that given the lack of standard scores reported in papers on youth involved in the criminal system, research was lacking to inform this hypothesis (Greene, 1996; Drakeford, 2002). It was suggested, however, that since the length of the full SpellRead program is 120 hours, and the students in the Youth Advocate Program only received the first 40 hours of instruction, the reading skills of these youth would not be fully remediated. To further complicate the situation, given possible attendance difficulties, not all students may have received the full 40 hours of intervention.

The fifth research question examined how the students from the Youth Advocate Program responded to the evidence based intervention in comparison to the age-matched, reading-level matched controls that came into the centre with their families. It was conservatively hypothesized that both groups would make similar gains at the conclusion of the 40 hours. On the other hand, given possible difficulties with program delivery for those in the YAP, as well as expectations for nightly independent practice on key skills, it may be that the students from the Youth Advocate Program would not improve in reading skills to the same extent as the age-matched comparison group.

Method

Participants & Study Design:

Data collection was part of the program delivery of SpellRead at the Halifax Learning Centre. For the purposes of this study, there were two overarching groups of participants created; subgroups of each were formed to answer the various research questions. The first group, used to compile all experimental groups, were students from the YAP who completed an initial assessment as part of the YAP intake process. The second group, used to compile all comparison groups in the analyses, were Halifax Learning Centre students who were enrolled in the SpellRead program by their families due to reading difficulties, and matched with the experimental group on chronological age and gender. The data for the comparison group was part of a larger study, previously reported in Metsala, Arnold, and Steele (2013). Table 1 shows the way participants from these two main groups were parsed to address analyses associated with each research question. Table 2 and 3 show the mean chronological age and gender across all groups.

Table 1
Groups Formed for Addressing Each Study Question

<u>Research Question</u>	<u>Experimental Group</u>	<u>Comparison Group</u>
Q 1. What percentage of the YAP students presented with reading difficulties?	All YAP students given initial assessment	No comparison students
Q 2. Were the reading profiles similar across the YAP students and an age-matched comparison group with reading difficulties?	YAP students with reading difficulties (N=38)	Age-matched SpellRead comparison students (N=38)
Q. 3. What percentage of the YAP students who started the program completed the planned intervention?	YAP students who started SpellRead program (N=38)	No comparison students
Q.4. Was there significant improvement on study measures? Were final scores within average range?	YAP students who had initial and final assessments (N=12)	No comparison students
Q.5. Did the YAP students benefit from the program to the same extent as an age-matched, reading-level matched comparison group?	YAP students with initial and final assessments (N=12)	Age-matched and word reading-level matched SpellRead students (N=12)

Table 2
Mean Chronological Age (CA) and Gender in the YAP Group

Subgroup	CA		Gender	
	Mean	SD	Male	Female
N = 38	13 years, 5 months	1 year, 6 months	31	7
N = 12	13 years, 4 months	1 year, 1 month	10	2

Table 3
Mean Chronological Age (CA) and Gender in the Comparison Group

Subgroup	CA		Gender	
	Mean	SD	Male	Female
N = 38	13 years, 2 months	1 year, 9 months	27	11
N = 12	13 years, 1 month	1 year, 3 months	10	2

Procedure

The measures in this study were individually administered to all participants at pre-test and again at the completion of approximately 40 hours of the SpellRead intervention. Non-standardized measures were used to assess the reading related processes of phonological awareness, grapheme-phoneme correspondence knowledge and pseudoword spelling. Standardized tests were used to measure pseudoword reading, word reading, fluency and comprehension. Measures used for each area are described next.

Phonemic awareness. Phonemic awareness is the ability to hear, identify and manipulate the smallest units of sound.

Phoneme synthesis. This subtest involved blending sounds together to form a word/non-word (e.g. “/m/ /oo/” = “moo”). There were 12 words and 12 non-words. The students were required to listen to a series of sounds and then put the separate sounds together to make a whole

word/non-word. Responses were required to be provided within three seconds to be correct.

There were 24 items on this measure.

Phoneme analysis. This subtest involved breaking up a word/non-word into its individual phonemes/sounds (e.g. “moon” = “/m/ /oo/ /n/”). The students were required to repeat the word/non-word and then say it one sound at a time. Responses were required to be provided within three seconds to be correct. There were 24 items on this measure.

Phoneme identification. The students were required to identify the vowel sound in a consonant-vowel-consonant syllable (e.g. “sheep” = “/ee/”). Responses were required to be provided within three seconds to be correct. For this measure, there were 20 items.

Grapheme phoneme knowledge.

Letter-sound correspondences. The students were shown a written grapheme and were required to say what sound was made by each of the English vowels and consonants (e.g. “f”, “ch”, or “oo”). Responses were required to be provided within three seconds to be correct. There were a total of 44 items on this test.

Reading measures.

Pseudoword reading. The Word Attack subtest of the Woodcock Reading Mastery test (Woodcock, 1998) was used to measure the student’s ability to decode unknown orthographic configurations. This test contains 45 nonsense words, which get increasingly more difficult as the student progresses. Once the student gets six trials wrong, the test is discontinued.

Word reading. The Word Identification subtest of the Woodcock Reading Mastery test (Woodcock, 1998) was used to measure an individual’s ability to identify real words out of context. The students were required to name individually presented letters and words. This test

contains 76 words, which get increasingly difficult as the student progresses. Once the student gets six trials wrong, the test is discontinued.

Fluency and comprehension. The Gray Oral Reading test (Wiederholt & Bryant, 2001) was used to measure an individual's ability to read fluently and comprehend grade-specific passages of text. The students read an individual paragraph aloud and then were required to answer five comprehension questions after reading each paragraph. The questions and four multiple choice answers were read to the student by the examiner. The amount of time taken to read each paragraph was recorded to provide a rate measure, as well all word identification errors are noted and also factor into the rate measure. The rate and accuracy measures are combined to create a fluency measure. Once the student gets 3/5 comprehension questions incorrect or, once the fluency score equals two or less, the test is discontinued.

Spelling measure.

Spelling pseudowords. This 15-item spelling test from the SpellRead test battery (MacPhee, 1990) required students to write the spelling of nonwords, such as, "moosh", or, "poyt", which were repeated twice by the examiner.

Intervention Program

SpellRead (MacPhee, 1990) is a reading intervention program for individuals with reading difficulties that focuses on improving students' phonological awareness and word reading accuracy and automaticity, as well as reading comprehension and fluency. This program trains phonological-decoding accuracy and automaticity and reading fluency while also providing some explicit comprehension and vocabulary instruction in each session. The modified program used in the current study is comprised of 50 individual lessons that are carefully scripted and sequenced. Each 60 minute session includes 40 minutes of phonemic activities

(working with the sounds), 15 minutes of reading aloud, and 5 minutes of writing. The lessons begin with the sounds that are easiest to hear and manipulate and then blends them together to make consonant-vowel syllables, vowel-consonant syllables and then consonant-vowel-consonant syllables. The students work on each sound or sound blend until they have mastered it, meaning that there is no hesitation whatsoever when they go to read or write the sounds. This approach helps to identify words accurately and quickly. The phases that are not included in the modified SpellRead program focus on the secondary spellings of the vowels (e.g., a-e, ay, ai), consonant blends (e.g., shr, sm, squ), common clusters (tion, tious), pronunciation and spelling of verb forms (ed, ing), and developing auditory-visual automaticity at the two-syllable level.

With the use of flashcards, students are introduced first to letter-sound correspondences that are easiest to learn (e.g., a, g, s), gradually progressing to sounds that are more difficult to learn (e.g., y, ea, ou). Flashcards then progress to reading consonant-vowel, vowel-consonant, and consonant-vowel-consonant nonwords combinations. There are 9 different card packs in the first phase of the SpellRead program. Each student works on becoming faster and faster with one set of flashcards until a predetermined time is reached with no more than two errors on the card pack, before advancing to the next card pack. For every error that a student makes, one second is added to their total time. When the required times (the silver time of two seconds per card) for all card packs in a single phase are reached, the student returns to the first card pack in the phase and works towards achieving the ideal time (the gold time of one second per card) for each card pack. The use of these card packs illustrates SpellRead's focus on building accuracy and automaticity with recognizing orthographic patterns.

Program Context and Participant Recruitment

A proportion of youth involved in the YAP received an intake assessment from the Halifax Learning Centre in order to determine their functioning in reading skills¹. The intake assessment was completed by a trained evaluator and comprised of testing on the measures described in this paper. The YAP students who were identified as having below average levels of reading skills (two grade levels below expected) on the pre-assessment measures were invited to participate in the SpellRead program. Following the completion of the planned program, the students also completed a post-treatment assessment to determine the progress made since the beginning of the program.

Results

The first research question examined what proportion of youth in the Youth Advocate Program could be estimated to have reading difficulties. Reading difficulties were defined as word recognition skills below the 30th percentile² or reading fluency skills at or below the 25th percentile³. It was hypothesized that more than 30% of youth (the proportion we might expect to have reading difficulties in the normal population (e.g., Shaywitz, 2003)), in this program would meet these criteria. There were 60 students in five years who were assessed in reading at intake for the YAP. Of these, 33 had word recognition at or below the 30th percentile and 34 had fluency scores at or below the 25th percentile. Therefore, it was estimated that 63% of the youth

¹ When the YAP was initially established, the Halifax Learning Centre participated in every single YAP intake assessment. As time progressed, the Halifax Learning Centre discontinued participating in every intake assessment, and was only requested to conduct a reading assessment when the student's Youth Advocate Worker indicated that the student might have reading difficulties.

² Below the 30th percentile on word recognition was chosen because intervention studies on readers with or at risk for reading failure frequently categorize students as being out of the range of reading difficulties when they score above the 30th percentile (e.g., Denton, Wexler, Vaughn, & Bryan, 2008). According to Siegel and Mazabel (2013), good or average readers are defined as having scores on reading tests at or above the 30th, 35th, or 40th percentile (depending on the study).

³ The reading fluency measure (GORT-4) was given on a standard scale with a mean of 10 and SD of 3. Thus, the finest discrimination was for at or below the 25th percentile (there is no corresponding scale that is less than the 30th percentile).

who were entering the YAP had one or both areas as difficulties in reading.

The second research question concerned the similarity in reading profiles of the YAP students and a comparison group whose families had sought out and enrolled them in the SpellRead program. First, a comparison group was created from the 225 SpellRead students for whom data was available over the past 5 years. To this end, each of the 38 students with reading difficulties from the YAP was matched as closely as possible with a comparison student on chronological age and when possible, on gender. An independent *t*-test on chronological age showed that the groups did not differ on this variable $t(74) = -0.78, p > 0.05$. The mean chronological age of the comparison group was 13 years, 2 months (range: 9 years, 11 months to 16 years, 9 months) and was comprised of 11 females and 27 males. The mean chronological age of the YAP group was 13 years, 5 months (range: 9 years, 4 months to 16 years, 11 months) and was comprised of 7 females and 31 males.

Independent sample *t*-tests were completed in order to determine whether the profile on reading and reading related measures collected at intake were similar across students in the YAP group and the comparison group. Results of the independent sample *t*-tests demonstrated that the mean performance on standardized reading measures were not significantly different between groups for word recognition, $t(74) = 0.94, p > 0.05$, pseudoword recognition, $t(74) = 0.34, p > 0.05$, fluency, $t(70) = 0.33, p > 0.05$, nor on the non-standardized measures of pseudoword spelling, $t(73) = 0.91, p > 0.05$, and letter-sound correspondences, $t(73) = 1.40, p > 0.05$. The comparison group performed significantly higher than the YAP group on measures of reading comprehension, $t(70) = 2.09, p < 0.01$, phoneme synthesis, $t(74) = 3.12, p < 0.05$, phoneme analysis, $t(74) = 2.43, p < 0.05$ and phoneme identification, $t(74) = 2.06, p < 0.05$. See Table 4 for group means and standard deviations for each of these variables. Please note that for the YAP

group there was data missing for four students for the reading comprehension/fluency measure and for one student for the pseudoword spelling measure.

Table 4

Performance on Reading Measures at Program Intake in the YAP and Comparison Group

Reading Measure	Comparison Group			YAP Group		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Word Recognition	38	82.68	9.86	38	80.00	14.58
Pseudoword Recognition	38	86.87	9.51	38	85.92	14.08
Reading Fluency	38	3.71	2.45	34	3.53	2.18
Reading Comprehension	38	7.71	1.99	34	6.65	2.33*
Phoneme Synthesis	38	17.79	3.89	38	14.92	4.11*
Phoneme Analysis	38	15.68	5.66	38	12.55	5.59*
Phoneme Identification	38	9.37	3.44	38	7.82	3.12*
Pseudoword Spelling	38	7.89	4.13	37	7.05	3.88
Letter-sound Correspondence	38	17.39	4.72	38	15.66	6.00

Note. *Indicates group comparisons were significant at $p < 0.05$. Standard Scores were used for Word Recognition, Pseudoword Recognition, Reading Comprehension and Reading Fluency. Number correct were used for Phoneme Synthesis (24 items), Phoneme Analysis (24 items), Phoneme Identification (18 items), Pseudoword Recognition (15 items), and Letter-sound Correspondence (26 items).

In order to capture some of the difficulties in delivering the program to this population, I had hoped to outline the number of YAP students who started and completed the program. This was not possible as some YAP students who partook in the SpellRead program did not return for the final assessment, and records of total hours completed by each student were not available. Difficulties in program delivery as reported by SpellRead personnel are elaborated upon in the discussion section of this paper.

In order to address whether YAP students improved on reading measures from pre- to post-testing and whether they did so to the same degree as comparison students who also completed 40 hours of the SpellRead program, a second comparison group was created. In total, 12 YAP students had completed approximately 40 hours of SpellRead and had pre- and post-test data. Twelve comparison students were matched as closely as possible with the 12 YAP students on chronological age and pre-test word recognition skills, as well as on gender. An independent

t-test on chronological age showed that the groups did not differ on this variable $t(22) = -0.48, p > 0.05$. The mean chronological age of the comparison group was 13 years, 1 month (range: 11 years, 8 months to 15 years, 6 months) and was comprised of 2 females and 10 males. The mean chronological age of the YAP group was 13 years, 4 months (range: 12 years, 0 months to 15 years, 3 months) and was also comprised of 2 females and 10 males. As will be seen from the next set of analyses, the groups did not statistically differ on the second matching variable, pre-test word recognition.

Two-way mixed-design ANOVAs, with group (YAP, comparison) as a between-subject variable, and time of assessment (pre-test, post-test) as a within-subject variable, were completed in order to determine pre- to post-testing improvements and group differences. It was hypothesized that there would be a significant improvement between the pre- and post-treatment measures for the YAP students, and that both groups would make similar gains at the conclusion of the 40 hours of SpellRead. Results showed main effects of time of assessment for phonological awareness⁴, $F(1, 22) = 182.36, p < .01$, word recognition, $F(1, 22) = 71.97, p < .01$, pseudoword recognition, $F(1, 22) = 80.32, p < .01$, pseudoword spelling, $F(1, 22) = 83.73, p < .01$, fluency, $F(1, 22) = 32.90, p < .01$, and reading comprehension, $F(1, 22) = 11.57, p < .05$. There was a main effect of group only for the reading comprehension ANOVA, $F(1, 22) = 4.8, p < .05$.⁵ The interaction of group x assessment time was not significant for any of the ANOVAs. Cohen's *d* was used to calculate the effect size for all significant differences between time of assessment and group. Cohen's *d* indicates the amount of difference between two groups in standard deviation units. The magnitude of the effect for all significant treatment effects was

⁴ A composite variable made to measure phonological awareness was created from the phoneme synthesis, phoneme analysis, and phoneme identification subtests which contained a total of 68 items.

⁵ Since the instructional hours differed between participants and between the groups, ANCOVAs with this total time variable as a covariate were examined. Group comparisons between the YAP and comparison group did not change from the ANOVA tests for any of the Standardized reading measures.

large for: phonological awareness (3.128), word recognition (1.168), pseudoword recognition (1.679), pseudoword spelling (2.166), fluency (0.809), and reading comprehension (0.785)⁶.

Using word recognition as an example, an effect size of 1.817 indicates that there are almost two full standard deviations between the mean word recognition at pre-test and the mean word recognition at post-test. See Table 5 for group means and standard errors for each measure at pre- and post-test.

Table 5

Group Performance on Reading Measures at Pre-Assessment and Post-Assessment

Reading Measure	Pre-Assessment			Post-Assessment		
	<i>n</i>	<i>M</i>	<i>SE</i>	<i>n</i>	<i>M</i>	<i>SE</i>
Comparison						
Phonological Awareness	12	42.58	3.021	12	63.67	1.005
Word Recognition	12	81.92	2.35	12	91.75	2.780
Pseudoword Recognition	12	85.17	2.22	12	102.67	3.389
Pseudoword Spelling	12	7.67	1.086	12	13.83	0.521
Reading Comprehension	12	7.50	0.460	12	8.92	0.475
Reading Fluency	12	3.33	0.656	12	5.33	0.847
YAP						
Phonological Awareness	12	37.92	3.021	12	66.00	1.005
Word Recognition	12	80.75	2.35	12	91.33	2.78
Pseudoword Recognition	12	88.42	2.218	12	103.75	3.389
Pseudoword Spelling	12	7.67	1.086	12	14.00	0.521
Reading Comprehension	12	6.42	0.460	12	7.67	0.475
Reading Fluency	12	3.50	0.656	12	5.67	0.847

Note. Standard Scores were used for Word Recognition, Pseudoword Recognition, Reading Comprehension and Reading Fluency. Raw Scores were used for Phonological Awareness (68 items) and Pseudoword Recognition (15 items).

Therefore, for all measures examined, performance was significantly higher at post-assessment, following the completion of the SpellRead program. There were no differences in performance between the comparison group and the YAP group for most pre- or post-test measures; thus, the groups were performing at the same level and improved to the same extent

⁶ These effect sizes may be an overestimate of the true size of the significant effect, due to the fact that the groups had a small sample size ($n=12$), and should therefore be interpreted with caution.

with 40 hours of the SpellRead program (See Figure 1 and 2). Performance on the measure of reading comprehension, however, was significantly higher for the comparison group at both pre- and post-test assessment; however, the YAP students' reading comprehension benefitted from the SpellRead program to the same extent as the comparison students. Figure 3 illustrates both time and group main effects for the standardized reading comprehension measure⁷

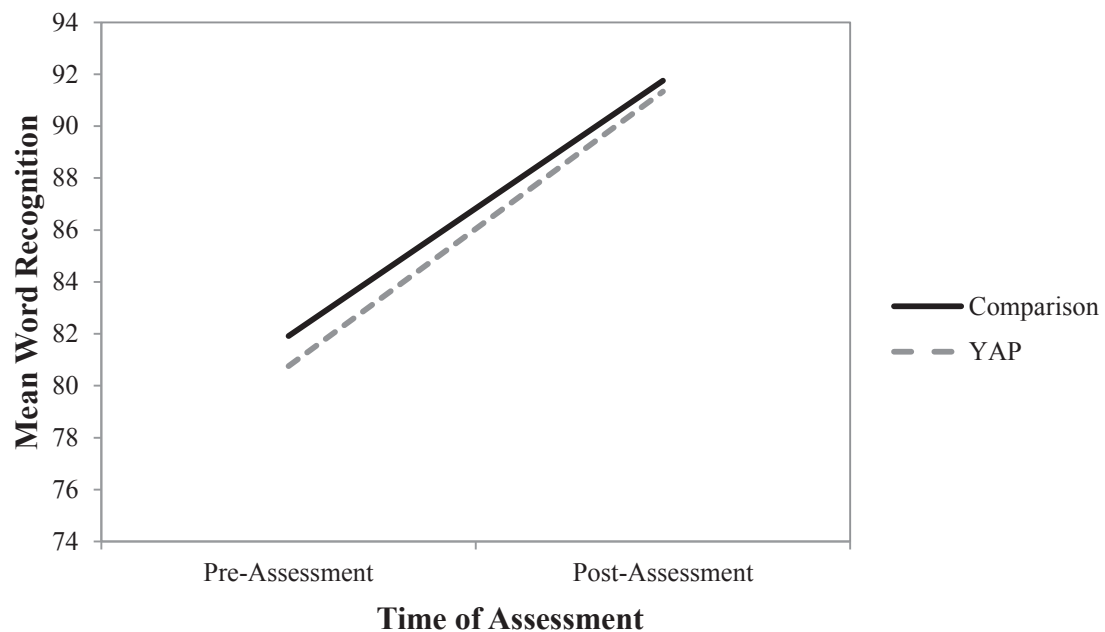


Figure 1. Mean performance on word recognition for the comparison group and the YAP group, measured at pre-assessment and post-assessment.

⁷ The reading comprehension measure (GORT-4) was given on a standard scale with a mean of 10 and SD of 3

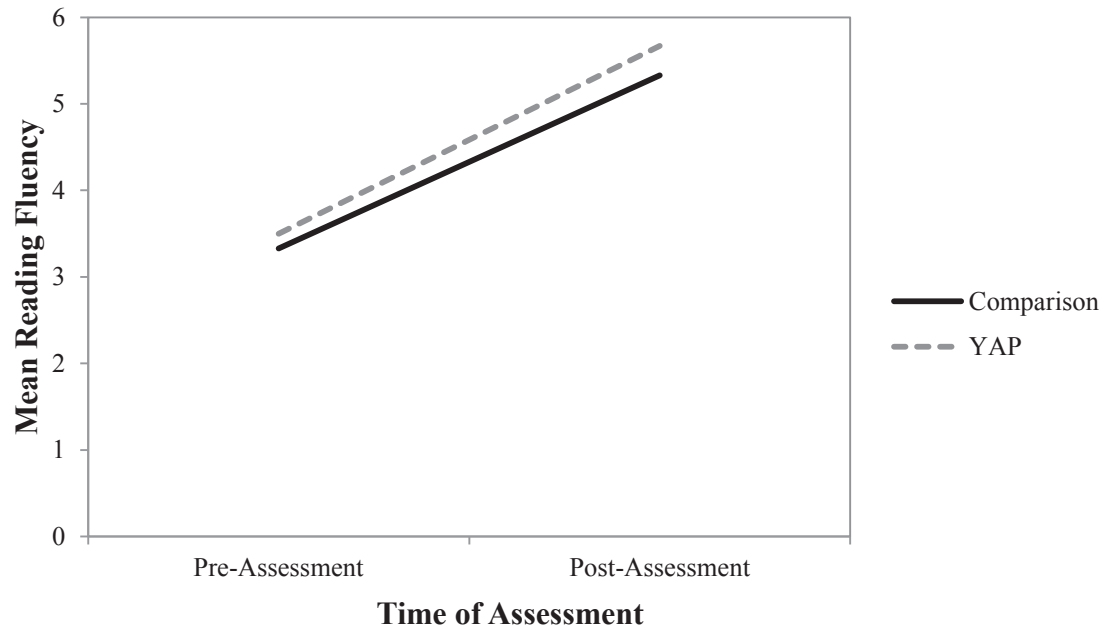


Figure 2. Mean performance on reading fluency for the comparison group and the YAP group, measured at pre-assessment and post-assessment.

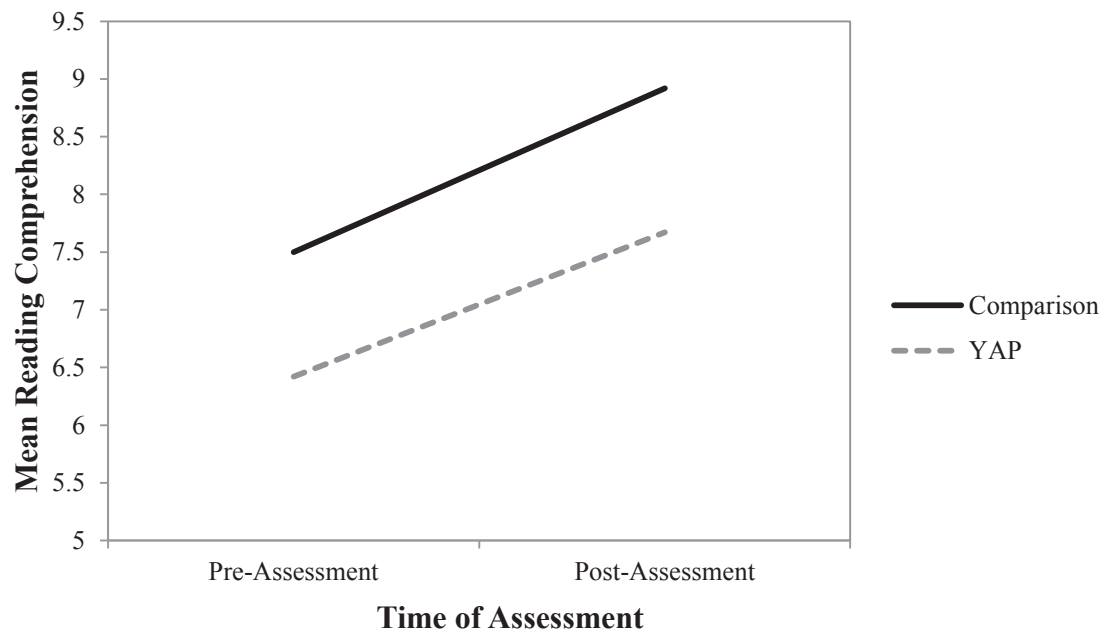


Figure 3. Mean performance on reading comprehension for the comparison group and the YAP group, measured at pre-assessment and post-assessment.

I was also interested in examining whether post-treatment standardized measures of reading skills moved into the average range for each student by the end of the 40 hours of the SpellRead program. Although I expected more students would be in the average range on standardized measures of reading at post-test, it should be kept in mind that the complete SpellRead program is 120 hours. The average range was defined as a standard score equal to or greater than 8 on measures of reading comprehension and fluency (consistent with the 25th percentile on these standard scales with a mean of 10 and SD of 3), and a standard score at or above the 32nd percentile on measures of word recognition and pseudoword recognition. As can be seen in Table 6, on each standardized reading measure, between 1 and 3 YAP students had scores within what I have defined as a solidly average range. On these same 4 measures at post-test, between 3 to 11 YAP students had scores within this range. Additionally, between 0 and 6 students from the comparison group had scores within the average range and on these same 4 measures at post-test, between 2 and 11 students from the comparison group had scores within this range.

Table 6

Number of Students in the Average Range on Reading Measures at Pre-Assessment and Post-Assessment

Reading Measure	Pre-Assessment		Post-Assessment	
	Average Range ^a (<i>n</i> = 12)	Average Range ^b (<i>n</i> = 12)	Average Range ^a (<i>n</i> = 12)	Average Range ^b (<i>n</i> = 12)
Comparison				
Word Recognition	1	1	6	6
Pseudoword Recognition	2	2	11	11
Reading Comprehension	6	4	9	8
Reading Fluency	0	0	2	1
YAP				
Word Recognition	1	1	6	6
Pseudoword Recognition	3	3	11	11
Reading Comprehension	3	0	8	3
Reading Fluency	1	0	3	2

Note. ^a Indicates Standard Score of 8 or above for Reading Comprehension and Fluency

^b Indicates Standard Score of 9 or above for Reading Comprehension and Fluency

Discussion

The main purpose of the present study was to better understand reading interventions for older students with reading difficulties, at a high-risk for gang involvement and criminal activity. This is an area with little research, particularly in the Atlantic Canadian context. The first research question examined what proportion of youth assessed at intake for the Youth Advocate Program could be estimated to have a reading difficulty. It was hypothesized that more than 30% of youth in this program would meet these criteria (30% is the proportion we might expect to have reading difficulties in the normal population) (e.g., Shaywitz, 2003). There were 60 students in five years who were assessed in reading at intake for the YAP and it was estimated that 63% of those students had difficulties with one or both areas of word recognition and reading fluency.

The population which was used to determine the percentage of students in the YAP that have reading difficulties includes all youth entering that program over the past 5 years. When the

YAP program was initially established, the Halifax Learning Centre participated in every single YAP intake assessment; therefore they assessed students with reading difficulties, who they offered the SpellRead program to, as well as students without reading difficulties. As time progressed, the Halifax Learning Centre discontinued participating in every intake assessment, and only conducted a reading assessment when the student's Youth Advocate Worker indicated that the student might have reading difficulties. Therefore, a proportion of the initial assessments that were completed by the Halifax Learning Centre were with students who were already flagged as having difficulties with reading. Given that the YAP worked with about 25 youth the initial year, with approximately 10 new youth per year, and the current data was collected over 5 years, it was estimated that 63% percent of students in the YAP have reading difficulties. This estimate is greater than would be expected in the general population and is consistent with research which suggests a higher proportion (45-65%) of reading difficulties for the population in the criminal system (Svensson, Lundberg, & Jacobson, 2001).

One interpretation of this high proportion would be that early failure on a basic skill such as reading, could lead to an increase in frustration and school failure, and contribute to increased risk in developing aggressive and acting-out behaviour and a higher incidence of conduct disorders (Christle & Yell, 2008). A different interpretation is that early reading difficulties are not related to later conduct problems and the maladaptive behaviour can be better explained by early-onset conduct problems that were present before the onset of reading difficulties (Fergusson & Lynskey, 1997). In this scenario, behaviour difficulties may contribute to increased incidence of reading difficulties. Finally, it may be that this high proportion of reading difficulties in at-risk youth can be explained by the relationship that exists between families' socioeconomic status (SES) and reading achievement. Children from low-income families

consistently demonstrate lower scores on measures of reading achievement than children from higher-income families (e.g., Dickinson & Snow, 1987; Jantz, 1987; Nicholson & Gallienne, 1995; Pungello, Kupersmidt, Burchinal, & Patterson, 1996). The YAP specifically targets youth in marginalized and disadvantaged communities. While indices of SES for each family of the youth involved in the YAP are not available, it is likely that the majority of youth in this study are from relatively economically impoverished families.

The study also sought to address whether these youth at a high-risk for criminal activity had corresponding deficits in the phonological domain as do typical youth with reading difficulties, or whether their phonological skills were largely intact. It was a possibility that a potential prolonged experience with an impoverished language environment and relative lack of amount of reading over many years may account for their reading difficulties. Research literature has shown that children in the general population with reading difficulties most frequently have phonological processing deficits and that these deficits impact all the reading areas that were measured in this study. Given the frequency of phonological deficits in populations with reading difficulties, and that these deficits may be a result of both genetic and environmental influences (e.g., Byrne et al., 2006) it was hypothesized that both groups would show similar profiles. For this comparison group, participants were matched with YAP students based only on age and gender. The YAP and comparison group did have similar profiles on intake assessments for measures of word recognition, pseudoword recognition, fluency, pseudoword spelling, and letter-sound correspondences. The comparison group performed significantly higher than the YAP group at study onset on measures of reading comprehension and phonemic awareness (phoneme synthesis, phoneme analysis, and phoneme identification).

The YAP students, therefore, had even greater deficits in phonological awareness than the comparison group. It may be that difficulties in the phonological domain for this population are due to both biological and environmental factors (e.g., D'Angiulli et al., 2004). Environmental factors would include reading and language experience at home. Children's early language and reading activities contributes to early word reading skills (e.g., Whitehurst & Lonigan, 1998); therefore, children from low-SES families where the focus may need to be on meeting economic and familial pressures, are at a higher risk for difficulties in these areas due to limited exposure to written language and reading activities at home (Whitehurst & Lonigan, 1998). Additionally, research has suggested that high-SES families can afford different services that may provide their children with a developmental advantage, whereas children from lower-SES families may lack access to the same resources and experiences, again placing these children at higher risk for academic problems (Bradley & Corwyn, 2002).

Schiff and Lotem (2011) state that children from low-SES families enter school with weaker phonological awareness skills than children from higher-SES families, which have an effect on the development of reading skills. Additionally, children from higher SES families make considerable gains in phonological awareness skills throughout school; however, children from lower SES families have been shown to progress at a much slower rate (Schiff & Lotem, 2011). Again, while family SES indices are not available for the current study, it is highly likely that significant SES differences are present between the groups. Recall, the YAP targets youth from communities that lack the resources of more economically advantaged communities. On the other hand, the SpellRead program can be costly, and families from the comparison group need to be in a position to come up with the resources to cover these costs.

Following this same line of reasoning, reading comprehension skills can also be affected by environmental factors, such as the home literacy environment. Recall the students in the YAP scored lower than the comparison group in reading comprehension. Van Steensel (2006) reported that the home literacy environment had an effect on children's vocabulary skills in grade one, and their reading comprehension skills in both grade one and two. Lee and Croninger (1994) found that the home literacy environment and parents' involvement at school were significantly associated with reading comprehension ability in students from low-SES families. Parents from low-SES families who read frequently, pursued literacy experiences for their children, attended school meetings and events, and who volunteered at school had children who gained more in reading comprehension than parents who did not engage in these activities (Lee & Croninger, 1994). Although all parents surely want to help their children do well in school, not all parents have the time, resources, and academic experience to provide such support. Many cognitive and linguistic skills have also been directly linked to reading comprehension outcomes. These skills include word recognition, verbal comprehension, vocabulary, world knowledge, reading experience, and motivations for reading (e.g., Katzir, Lesaux, & Kim, 2009).

Additionally, difficulties in reading become increasingly difficult to remediate the older the student becomes. Lovett and colleagues (1994) demonstrate that the core disabilities of older students could be somewhat improved through intensive direct instruction. However, at the conclusion of their study student's mean reading skills still fell in the severely disabled range (below the 2nd percentile) (Lovett, Bordon, Lacerenza, Benson, & Brackstone, 1994).

The main impetus for the present study was to examine whether high-risk youth made significant gains after completing the initial part of an intensive reading intervention and how these youth improved in comparison to the students with similar word reading abilities who were

enrolled in the SpellRead program by their families. It was hypothesized that the YAP students would make significant gains on reading measures following the intervention, and that both groups would make similar gains at the conclusion of approximately 40 hours of the SpellRead program. For all measures examined, performance was significantly higher at post-assessment, following the completion of the SpellRead program. Further, there were no differences in performance between the comparison group and the YAP group for pre- or post-test measures of phonological awareness, word and pseudoword recognition, pseudoword spelling, and reading fluency. Thus, similar gains with approximately 40 hours of the SpellRead program were observed across both groups of students. Performance on the measure of reading comprehension was significantly higher for the comparison group at both pre- and post-test assessment; however, the YAP students' reading comprehension benefitted from the SpellRead program to the same extent as the comparison students.

Even though the YAP students had the same level of reading skills as the comparison group at pre- and post-intervention, they were not able to perform as well as the comparison group on the reading comprehension measure. As previously noted, in order to have effective reading comprehension skills, readers must be able to draw on well-developed vocabulary and background knowledge as well as significant experiences with print while simultaneously maintaining an outlook towards reading that results in both a positive attitude and a perception of self-efficacy (Katzir, Lesaux, & Kim, 2009). Again, as previously noted, a well-developed vocabulary, background knowledge, and significant experience with print may be lacking in both the early home literacy environment of youth from the YAP, as well as relatively less experiences in reading and learning to develop background knowledge and vocabulary. Additionally, proficient reading is thought to develop via a hierarchical process of skill

development that includes phonemic awareness, phonics, fluency, vocabulary, and comprehension. Difficulties in early skills would affect the final stage, and the purpose or function of reading, comprehension (McCallum et al., 2011). While comprehension was negatively affected in both groups, it appears that the students in the YAP did not have the same language and background knowledge to comprehend text as well as the comparison group.

Overall performance on reading measures for the YAP and comparison groups were similar to the treatment gains made in a study with elementary students (grades 1-6) by Rashotte and her colleagues (2001). Following the first phase of their reading intervention within a public school (35 hours of SpellRead instruction) the treatment group performed significantly better than the wait-list comparison group on phonological awareness, decoding, comprehension and spelling. The average scores in that study on each of these measures came into a range above the 25th percentile. In the current study, average measures of word recognition and pseudoword recognition were above the 25th percentile for the YAP students, and reading comprehension came to be above the 16th percentile (see also Torgesen et al., 2001). Most studies of reading programs with high-risk or incarcerated youth/adults have not reported standardized test scores (e.g., Greene, 1996; Drakeford, 2002); so this study advances our understanding of the practical gains that can be made in these youth's reading achievement.

Rashotte et al. (2001) reported that reading fluency measures came in the normal range or were higher than the control group for the Grade 1-4 students; however, mean word and text fluency scores for the Grade 5 and 6 students remained below the 25th percentile after the intervention and did not differ from the wait-list comparison group. In the current study, the groups did significantly improve on measures of reading fluency (mean scores from the 1st to the

5th percentile from pre- to post-intervention), these standardized fluency scores remained significantly below the average range.

It was also examined whether for individual students, post-treatment measures of reading skills moved into the average range by the end of the SpellRead instruction. Approximately 40 hours of intervention is a relatively brief intervention, and it was thus predicted that achievement scores for most youth following the intervention may still fall short of the average range. According to Torgesen and colleagues (2001), it is harder to get the reading scores of older students with reading difficulties into the average range, although with intensive intervention, most areas other than fluency can come into this range. Torgesen (2006) suggested that the problem with improving reading fluency may not be with the interventions themselves and suggested that it may be the lack of reading practice over time that is the obstacle to improving reading fluency for samples of older children with reading difficulties.

In the current study, fluency scores were also more resistant to normalize than other reading measures. In terms of reading fluency scores, there were no YAP students in the average range at study onset and two students in the average range following the intervention. Similarly, the comparison group had zero students in the average range at study onset and one student in the average range following the intervention. However, following the first part of the SpellRead intervention, the remaining reading measure scores of the YAP students appears to have improved at least as well as the older children in Torgesen and colleagues study (2001). Following the intervention reported in this paper, 50% of students in both groups were in average range on word recognition, 92% of students in both groups were in the average range on pseudoword recognition, and 67% of students in the comparison group and 25% of students in the YAP group were in the average range on reading comprehension. Although this intervention

was unable to completely remediate their reading skills, significant gains were made and the gap was narrowed with typically achieving readers. The youth did only receive approximately the first 40 hours of the 120 hour SpellRead program. The first phase focused more on building accuracy and automaticity with recognizing orthographic patterns, whereas the second and third phase would increase the focus on fluency and comprehension.

Lovett and her colleagues (2012) studied the effects of an intensive reading intervention (60-70 hours over 20 weeks) on a population of high school students (mean age 14.7). These researchers found that the overall post-treatment scores of these older poor readers did not come within the average range on measures of reading achievement. The authors concluded that more than one semester of intervention would be required to consolidate the word identification and comprehension gains and move into the average range (Lovett et al., 2012). Mean standard scores on measures of word recognition and pseudoword recognition at pre- and post-intervention in that study were considerably lower than the current study and intervention gains appear to be less than in the current study. The participants in the treatment group of Lovett and colleagues (2012) study had mean standard scores of 72.91 and 76.19 on word recognition at pre- and post-intervention, and mean standard scores of 76.09 and 82.27 on pseudoword recognition at pre- and post-intervention. Collapsed across groups, the participants in the current study had mean standard scores of 81.33 and 91.54 on word recognition at pre- and post-intervention, and mean standard scores of 86.79 and 103.21 on pseudoword recognition at pre- and post-intervention following approximately 40 hours of instruction (mean hours 42; range 16-67.5 hours). Although, not directly comparable as Lovett et al's students were more impaired in initial decoding skills, the students in the current study made significantly greater standard score gains than in Lovett et al's study.

The participants in the treatment group of Lovett and colleagues (2012) study fell in the 4th and 10th percentile on reading comprehension at pre- and post-intervention. The participants in the comparison group of Lovett and colleagues (2012) study fell in the 4th and 6th percentile on reading comprehension at pre- and post-intervention. The participants in the YAP group of the current study fell in the 9th and 16th percentile on reading comprehension at pre- and post-intervention. The participants in the comparison group of the current study fell in the 16th and 25th percentile on reading comprehension at pre- and post-intervention. Although, not directly comparable as Lovett et al's students were more impaired in initial reading comprehension skills, the students in the current study made significantly greater percentile gains than in Lovett et al's study.

It should be noted that these significant gains were made by the YAP students despite some difficulties with attendance; not all students received the full 40 hours of the intervention. In the comparison group, some students received 30 hours of total instruction; however, other students received 67.5 hours of total instruction. In the YAP group, the range was between 16 and 50 total hours of instruction, with a mean instructional time of 35 hours. Even though the instructional hours differed between participants and groups, the group comparisons between the YAP and comparison group did not change for any of the standardized reading measures when ANCOVAs with total hours of instruction as a covariate were examined. The gains made by the YAP students are impressive as they kept pace with the comparison group on most reading measures and seem to have improved favourably compared to studies with older elementary students (Torgesen et al., 2001) and high school students (Lovett et al., 2012).

Some strengths of the current study include addressing some of the previously mentioned limitations to the literature on reading interventions for older students with reading difficulties

and reading interventions for juvenile offenders. For example, several reading intervention studies have not reported standard scores and/or how many participants had scores in the average range on pre- or post-intervention reading measures (e.g., Rashotte et al., 2001; Vaughn et al., 2010; Lovett et al., 2012, Greene, 1996; Drakeford, 2002). In reading intervention research, it is important to be able to quantify how much of a gain can be achieved with the reading intervention in order to better understand the practical impact on students' reading achievement.

Malmgren and Leone (2000) also used standard scores from the GORT-3 to determine if a significant gain was achieved on measures of reading, following their short-term reading intervention with 45 incarcerated African-American youth. The authors reported mean standard scores of reading rate, accuracy, passages, and comprehension at both pre- and post-intervention. Participants in their study had had mean standard scores of 4.04 and 5.04 on rate at pre- and post-intervention, mean standard scores of 3.87 and 5.13 on accuracy at pre- and post-intervention, and mean standard scores of 3.00 and 3.84 on comprehension at pre- and post-intervention. These scores differ from the results of the current study where students in the YAP group had mean standard scores of 6.42 and 7.67 on reading comprehension and mean standard scores of 3.50 and 5.67 on reading fluency at pre- and post-intervention. Standard scores are an excellent metric for determining the "success" or "failure" of interventions for children with reading difficulties, because they describe the student's relative position within the distribution of reading skills in a large standardization sample (Torgesen, 2006). By reporting these standard scores, the readers are able to conclude how much (or how little) of a gain can be made.

Further limitations of the literature addressed by the current study were that the majority of studies in this area had been completed in the United States (e.g., Williams et al., 2011; Greene, 1996) and most research on reading interventions for juvenile delinquents focused on

incarcerated youth rather than at-risk youth (e.g., Williams et al., 2011; Greene, 1996; Malmgren & Leone, 2000; Drakeford, 2002). The current study provides an Atlantic Canadian example to the existing literature and focused on at-risk youth rather than incarcerated youth. Other strengths of the current study include the use of a well-matched comparison group, as students in the YAP group were matched with students in the comparison group on chronological age, word reading level, and gender when possible. Many studies in the context of juvenile offenders have not included any comparison groups.

A limitation of this study (and the literature more generally), however, is the lack of a no-treatment comparison group. The advantage of such a group would be to strengthen the argument that the intervention caused the improvements in reading achievement. According to Malmgren and Leone (2000) “The simple pre- post-test design did not allow us to rule of the possibility that these students would have demonstrated growth in reading behavior without access to our intervention, as unlikely as that case might be.” (p. 246). Similar to Malmgren and Leone (2000), we conclude that growth in reading ability without access to the intervention would have been unlikely. The treatment was relatively brief (approximately 40 hours over about 20-40 weeks) and gains were made in most areas of standardized reading achievement do not appear to have been seen in these students’ previous cumulative years of schooling.

The small sample size, with a group size of 12 for treatment and comparison groups is also a limitation of the current study. Small sample size can limit finding significant results (lack of power) and can limit the generalizability of the study; however, given that most measures did not differ between the two groups, the results of intervention gains are drawn over a sample of 24 individuals. Further, the absolute size of study gains is very similar to research on the local SpellRead population with word recognition deficits with a sample size of approximately 140

students (Metsala, Arnold, & Steele, 2013). Finally, group differences in the current study were found on the comprehension measure, suggesting that power was sufficient to detect differences between the two groups. Further, similar published research has been completed with small sample sizes. Vadasy, Sanders, and Peyton (2006) implemented a reading intervention for second and third graders, with 11 participants in their treatment group and 10 participants in their control group, and reported finding significant effects using similar statistical analyses as the current study. Additionally, Kirk and Gillon (2009) implemented a reading and spelling intervention for 8-11-year-olds with 8 participants in each of the treatment and control groups; these authors also found significant effects.

The following difficulties in program delivery were reported by SpellRead personnel (Steele and Arnold, personal communication). The first delivery of the program took place in the summer of 2009. The youth attended two mornings weekly for three hours each morning and received instruction in a group of five. It was reported that it was difficult to get good attendance in the summer. Program delivery was thus changed to take place during the school year and was moved to a location closer to each youth's community or in their schools, and was delivered to individual students. Several schools allowed the student's performance in the SpellRead program to reflect part of the student's grade for English class. Some behavioural difficulties with the youth, such as skipping sessions or getting up and leaving in the middle of the session were also noted, however, it was reported these behavioural difficulties often subsided once the students' reading skills started to improve and "buy-in" was achieved. It was also reported that some of the older students had a hard time understanding why they were spending so much time working on learning phonemes and lower level reading skills and had a hard time understanding the relevance to reading. SpellRead personnel decided to show the students the future lessons in

phase B and C and how mastering the automaticity of skills in phase A would help them with later word recognition, fluency and comprehension.

The results of the current study contribute to existing literature because it demonstrates that reading interventions, such as the SpellRead program, can be successful in improving reading skills in older, at-risk youth with reading difficulties. It is important to improve the reading skills of the youth in this particular group because previous research has demonstrated a strong relationship between academic failure (particularly reading difficulties) and delinquency (e.g., Drakeford, 2002; Leone et al., 2005; Malmgren & Leone, 2000). Poor literacy skills are common in youth at-risk or involved in the juvenile justice system, for that reason, proficient reading ability may provide a key protective factor for at-risk youth (Christle & Yell, 2008). Reading interventions, such as the SpellRead program, are an important aspect of increasing literacy skills and may be one aspect of programs aiming to help prevent future criminal behaviour. In order to determine if increasing literacy skills can be linked to preventing future criminal behaviour, future research may include replicating the current study using students in a crime prevention program and a no-treatment community comparison group and consequently implementing a longitudinal study design to report on future criminal behaviour.

Introducing the SpellRead program in combination with the Wraparound model of the Youth Advocate Program is extremely beneficial to at-risk youth, due to the fact that it addressed both the internal (academic difficulties) and external (e.g., issues involving family, community, peer relations, and school) risk factors that can contribute to delinquent behaviour and incarceration in youth (Catalano, Loeber, & McKinney, 1999; Dobbin & Gatowski, 1996; Dodge, 1999; Hawkins et al., 2000; Loeber & Farrington, 2000). The more risk factors a youth is exposed to, the more likely they will become involved in the juvenile justice system, and both of

the programs in the current study addressed many of these potential risk factors by providing these students with internal and external protective factors (Christle & Yell, 2008).

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