

Running Head: EFFECTIVENESS OF A GROUP-BASED TUTORIAL

The Effectiveness of a Group-based Tutorial Direct Instruction Program for Long-term Foster-care Children: A Randomized Controlled Trial.

by

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### Abstract

Children in foster care are frequently behind in educational achievement (Flynn, Ghzal, Legault, Vandermeulen, & Petrick, 2004) and perform below grade level (Trout, Hagaman, Casey, Reid, & Epstein, 2008 for a review). Vacca (2008) found that children in foster care perform seven to eight percentile points lower in achievement test scores when compared to children in the general population. Furthermore, research has shown that youth in out-of-home care are more likely to drop out of school, and are three times more likely to be suspended due to problem behaviours, which affect academic performance and attainment (Zima et al., 2000). For the long term success of these children, efforts at successful academic remediation are critical. This study evaluated the effectiveness of a direct instruction literacy and math program (“Teach Your Children Well”; TYCW) in a small group format to educationally disadvantaged children in foster care. Across the two years of the study, 101 children in long-term foster care, between grades 1 and 8 inclusive, participated in this randomized control trial intervention. One-half were randomly assigned to the 30-week experimental TYCW condition, while the other half served as waitlist controls. Children were assessed at baseline and post-intervention on word reading, spelling, sentence comprehension, and mathematic skills using an academic measure of functioning, the Wide Range Achievement Test Forth Edition (WRAT4). In addition, children were assessed at baseline and post-intervention across teacher rated academic performance in the classroom using the Academic Competence Evaluation Scale (ACES). Furthermore, foster parents of the participants completed broad-spectrum measures of clinical psychopathology (Achenbach System of Empirically Based Assessment; ASEBA), and measures of inattention and Attention Deficit Hyperactivity Disorder (ADHD; Conners’ ADHD/DSM-IV Scales; CADS). An analysis of covariance (ANCOVA) demonstrated a statistically significant increase

in standard scores on reading decoding, spelling and mathematic skills for those who received the tutoring, but no statistical group differences were obtained for sentence comprehension. Meaningful effect sizes, in the small to moderate range, were also found in support of the tutoring intervention across these three domains. An ANCOVA also demonstrated a statistically significant increase in standard scores on study skills and a trend towards an increase in critical thinking (ACES) for those who received the tutoring. The results also indicated that condition predicted improvements in word reading for those with elevated levels of school instability, and a trend towards those with high. Significant negative correlations were obtained for sentence comprehension change scores and baseline withdrawn/depressed; math change scores and baseline attention problems; and reading change scores and baseline social problems for all those who received the intervention. Furthermore, significant negative correlations were also obtained for sentence comprehension change scores and externalizing, and affective problems change scores, with trends towards negative correlations between spelling change scores and attention problems and conduct disorder problems, lending support to the secondary behavioural benefits of improved academic achievement. The implications of these findings as they relate to improving educational achievement and behavioural and clinical psychopathology among foster children are discussed.

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## The Effectiveness of a Group-based Tutorial Direct Instruction Program for Long-term Foster-care Children: A Randomized Controlled Trial.

The definition and approach to child maltreatment has been intricately embedded within the history and values of our society. What distinguishes childhood maltreatment from normal parental practices has been defined and redefined over the years from conceiving children as objects or property to our current laws which recognize the rights of children to a minimum level of safe and protective care. Regardless of how maltreatment has been defined or addressed, it is clear that the normal challenges of development are certainly compounded and interrupted for those children who experience abuse and neglect (Kinard, 1999). In the more severe situations where children enter foster care, there are typically a myriad of associated problems, including developmental and/or academic delays, mental health disorders (Clausen et al., 1998; Fanshel, Finch, & Grundy, 1990), and behavioural/social problems (Clausen et al., 1998; Klee, Kronstradt, & Zlotnick, 1997).

As foster care is intended to protect children and has the potential to remediate areas of deficit and poor functioning, it is essential to evaluate whether this can be successfully accomplished within the existing resources of the child welfare system. One important area of functioning in foster care children that requires further study is the viability of correcting commonly found deficits in academic functioning in this vulnerable population. The focus of this study will be to evaluate the effectiveness of a specific direct instruction tutoring program, Teach Your Children Well (TYCW), for children in long term foster care. First, however, the academic needs and profile of children in foster care will be described along with the resulting effects of these deficits on both short and long term developmental outcomes. This will be followed by a description of the common types of learning problems found in

children and academic instruction programs that have been developed to remediate academic deficits. The evaluation of one such academic intervention program, TYCW, for children in long term foster care will be described as part of the current research study.

### **Academic Needs of Children in Foster Care**

Children and adolescents in care are at a disadvantage in educational achievement relative to their same-age peers in the general population (Chamberlain, Moreland, & Reid, 1992). Research findings indicate that anywhere from 33% to 67% of foster care children experience poor academic achievement and require remedial assistance. This variability in the rates has resulted in some placing the number of children performing below grade level at one-third (Fanshel, Finch, & Gundry, 1990), while others contend that rates are around 45% (Pasztor, Clarren, Timberlake, & Bayless, 1986), or 67% (Zimmerman, 1982). Other researchers have reported that 59% of foster care children performed below grade level among which 11% were three to five years behind their non-foster care classmates (Fanshel & Quinn, 1978). These rates, although variable, depict academic deficits for foster care children that can seriously impede long term educational goals. Children in foster care also exhibit higher rates of learning disabilities (Nasstrom & Koch, 1996), grade retention (Zima, Bussing, Freeman, Yang, Belin, & Forness, 2000), and special education placement (Benedict & White, 1991). Zima and colleagues (2000) examined 302 youth between six to 12 years of age who had lived in an out-of-home placement and stratified them into acute (six to 12 months) and chronic (more than 12 months) placement groups. The results showed that 13% of the youth living in out-of-home care, including those in group homes, foster care, and those living with relatives, had repeated at least one grade; however there was no control group in this study which would allow for appropriate comparisons. According to Evans (2001), students that enter foster care appear to manifest

primary deficits in basic skill areas such as reading, math, and writing. These basic skills can be reduced to sight words, phonetic skills, performing math operations, and the mechanics of writing (Evans, 2001). In addition, it is important to note that foster care children are more likely as adults to experience the negative consequences of earlier academic deficits and failures including increased drop out rates, and reduced likelihood of pursuing post-secondary schooling (Blome, 1997).

In the United Kingdom, Heath, Aldgate, and Colton (1989) found that children involved in the child welfare system, whether in foster care or receiving social supports within the home, had higher levels of behaviour problems and lower educational attainment than the national average. The original and follow-up study did not use a standard control group, but compared foster children with another group of children receiving “preventive” social work support within the community, so that both groups would have similar backgrounds. These authors found that 91% of foster care children performed below average on one or more of the three measures of educational attainment studied including reading, vocabulary, and mathematics (Heath, Aldgate, & Colton, 1989). However, there were no statistically significant differences between the two groups. These foster children were lower in mathematics and somewhat higher in reading and vocabulary than the control group, which consisted of those children who received social supports while remaining at home. At the two-year follow-up, children who had performed poorly tended to catch up on repeated administration of the measures (Aldgate, Cotton, Ghate, & Heath, 1992). This progress was independent of contact with biological parents and showed a non-statistically significant tendency for those who returned home to show greater gains than those who remained in foster care. These results highlight the resiliency of children in care. Moreover, the expectation of a stable home placement was significantly related to academic

attainment and progress (Aldgate, Cotton, Ghate, & Heath, 1992). However, these results are based on a sample of 49 foster children and should be interpreted with caution.

Flynn and colleagues have conducted a number of studies examining the problem of low educational achievement among youth in out-of-home placements in Canada. Flynn and Biro (1998) found that children in foster care reported higher rates of suspensions and grade retention relative to same aged peers. More recently, results indicated that 80% of youth between the ages of 10 and 15 scored within the same range as the lowest third of the general Canadian population on measures of reading, spelling, and math (Flynn et al., 2004). For younger children between five and nine years of age, a similar high percentage of foster care children (i.e., 78%) scored in the same range as those in the lowest third of the general Canadian population based on subjective parental ratings (Flynn et al., 2004).

Research conducted in the United States has found similar results to those previously reported in Canada (Burley & Halpern, 2001). A state-wide analysis of the educational attainment of foster care youth in Washington's public school system was conducted to clarify barriers to educational improvement of those in long-term foster care (Burley & Halpern, 2001). These education analyses, conducted yearly, identified those with current or previous foster care placements. These foster youth represented a small percentage of the entire population of youth sampled and included 1.9% of those in grade 3, 2.2% of those in grade 6, and 2.2% of those in grade 9 (Burley & Halpern, 2001). Foster care youth in grades 3, 6, and 9 scored, on average, 15 to 20 percentile points below non-foster care youth on the IOWA standardized achievement tests for reading, language and math (Burley & Halpern, 2001). At both the elementary and secondary school levels, twice as many foster care youth that had repeated a grade, changed schools, or enrolled in special education programs (Avery, 2001; Burley & Halpern, 2001).

Low academic achievement in elementary school can continue into high school, limiting the opportunities for youth to prepare for higher education or careers. As a result of their lower academic achievements, foster care children can become locked by school administration into a general or vocational track rather than being able to take courses or participate in university or college preparatory courses (Blome, 1997). This can be further exacerbated by frequent foster home moves and a high volume of school placements (Blome, 1997). Multiple placement moves, or placement instability is universally considered disadvantageous to children in general (Barber, 2003). Frequent disruptions to the home and school environment needs to be considered when evaluating the relatively poorer academic performance of foster care children (Blome, 1997). For example, school-aged foster care children are twice as likely as their peers to have changed schools three or more times since grade 5 (Blome, 1997). Sixty-four percent of children in foster care did not switch schools after grade 5, compared with 80% in the general population (Blome, 1997). Moreover, placement stability has been associated with better outcomes and less school and peer disruptions (Fernandez, 2009). Also, a strong relationship has been found between placement instability and mental health service use by children in foster care. Those with higher placement instability utilize more mental health services (Newton et al., 2000; Rubin et al., 2006) and have fewer opportunities to develop permanent, secure attachments (Leathers, 2002). Emotional Behavioural Disorders (EBD), including Conduct Disorder, has been associated with more placement moves resulting from foster care breakdown (Fratter, Rowe, Sapsford, & Thoburn, 1999; Ward & Skuse, 2001).

In light of the consistent findings that children in foster care have significant academic deficits, it is important to recognize that these difficulties do not occur in isolation. In fact, it is common for academic deficits to be associated with other behavioural or developmental

problems. The Child Welfare League of America (2005) reported that more than 80% of children in foster care have an emotional and behavioural disorder (EBD) or developmental problem. Foster children have higher rates of EBD than same-aged peers as well as peers with similar backgrounds of maltreatment and deprivation who do not enter long-term foster care (Pilowsky, 1995). Trout, Nordness, Pierce, and Epstein (2003) found that 91% of children in a community based sample with emotional and behaviour disorders (EBD) were considered academically deficient as they performed below grade level, with none of the children performing above grade level. Given this high level of overlap, it is necessary to consider the behavioural and mental health adjustment of foster care children along with their academic needs,

### **Mental Health Needs of Children in Foster Care**

Internalizing and externalizing behaviour problems have been associated with decreased academic achievement and school functioning. It has been suggested that lower academic performance and behavioural difficulties may be both implicated in the higher rates of grade retention, drop-out, and overall school and peer failure observed among children in care (Casey et al., 2008; Wurtele et al., 1983). These mental health issues clearly limit children and adolescent's academic functioning, social quality of life, and overall psychological well-being.

As mentioned, children in foster care frequently exhibit concomitant mental health difficulties. It is common to observe higher levels of aggression, poor impulse control, depression, anxiety, Conduct Disorder, and delinquent behaviours in foster care children (Connor et al., 2004; Greenbaum & Dedrick, 1996; Moore & O'Connor, 1991; Quinn & Epstein, 1998; Silver et al., 1992). Externalizing behaviour, such as aggressiveness and Conduct Disorder, has been associated with academic deficits and legal involvement. Courtney, Dworsky, Ruth, Keller, Havlicek, and Bost (2005) found that 71% of their sample had committed at least one criminal

act while in foster care, and 25% had committed 7 or more delinquent acts. However, it is unclear whether pre-existing behavioural problems resulted in the increased association with illegal behaviour. McMahon and Clay-Warner (2002) suggest that the number of family moves prior to being placed in foster care mediated the effect on delinquency because the development and maintenance of social bonds reduced the risk of delinquency. However, research findings have been divided on this issue. A recent study by Lemmon (2006) suggested that child welfare placements reduce the odds of delinquency by 4 times, when controlling for race, location, and frequency of past maltreatment. This sample consisted predominantly of non-White children (82%), and highlights the benefits of placement for minority youth (Lemmon, 2006).

In addition to externalizing disorders, foster care children also display internalizing disorders to a higher degree than their same age non-foster care peers. A large scale study of 17 year old foster youths found that 18% met criteria for a major Depressive episode while in care, while 27% received a lifetime diagnosis of Major Depressive Disorder (McMillen, 2005). Furthermore, compared with a sample of working class 18 year old youths in the community (Reinherz et al., 1993), those results from the foster care youth had prevalence rates of Major Depression and Post-Traumatic Stress Disorder that were two times and three times higher, respectively (McMillen, 2005). Foster children also exhibited increased risk for suicide and suicidal behaviours relative to non-foster youth. Youth in foster care were found to be contemplating suicide at a rate 2.8 times higher (26.8% vs.11.4%) than their peers (Pilowsky & Wu, 2006) and had 4 times greater odds of having attempted suicide within the past year (15.3% vs. 4.2%) (Pilowsky & Wu, 2006). Overall, research suggests that foster care youth report higher levels of depression, anxiety, and an inability to regulate behaviour and emotions relative to control participants (Shin, 2004; Courtney, Piliavin, & Grogan-Kaylor, 1995; Fanshel, Finch, &

Grundy, 1990). Internalizing disorders, such as depression, have been linked to low levels of academic achievement and diminished perceptions of academic confidence (Shahar, 2006) and mastery (Nolen-Hoeksema & Girgus, 1994). These children are prone to helplessness in achievement settings and show lower achievement on standardized tests and lower grades, as they frequently give up when presented with difficult tasks (Nolen-Hoeksema & Girgus, 1994). As with externalizing problems, internalizing disorders like depression have been suggested to contribute to academic problems, which further exacerbate foster children's already significant academic deficits (Nolen-Hoeksem & Girgus, 1994).

The several critical aspects that affects academic performance are inattention, impulsivity, and hyperactivity, which form the constellation of symptoms associated with the diagnosis of Attention-Deficit Hyperactivity Disorder (ADHD). ADHD, which is a common childhood disorder affecting 3% to 7% of the school-aged population (American Psychiatric Association, 2000; Barkley, 2006), has resulted in mixed prevalence rates being observed among children in foster care. Studies have cited upwards of 40% to 92% of children in care as presenting with ADHD symptoms (Connor et al., 2004; Fields et al., 2006; Pugh et al., 1997), while other studies have cited lower rates among residential treatment settings for foster care (16%) or school-based samples (8%) (Silver et al., 1992). Children with ADHD are more likely to participate in antisocial behaviours, such as theft (Barkley et al., 2004), which has been associated with delinquency. Children with ADHD also show significant academic underachievement, poor academic performance, and educational problems (DeShazo, Lyman, & Klinger, 2002; Hinshaw, 1992; Fergusson, Horwood, & Lynskey, 1993). Children with ADHD also score significantly lower on reading and arithmetic achievement tests than controls (Biederman, Faraone, & Milberger, 1996). These findings suggest that the degree of inattention

and hyperactivity may interfere with a child's ability to learn reading, spelling and math and should be considered a potential moderating factor for academic instruction.

### **Long Term Outcomes for Children in Foster Care**

**Academic Outcomes.** The academic discrepancies observed between children in foster care and the general population can persist into adulthood and contribute to reduced future social, emotional, and employment success. It is important to recognize that these difficulties are not short term or limited to childhood. In many instances, the difficulties of foster children, if not addressed, can contribute to lifelong struggles and challenges.

A national foster care study conducted by Cook et al. (1991) evaluated the status of foster care youth 2.5 to four years after being discharged from the foster care system. A total of 810 youth were interviewed to determine whether those foster care youth who received independent living skills training exhibited better academic and employment outcomes, than those who did not (Cook et al., 1991). Of the total sample, 54% of youth who had been in foster care had completed high school, compared to 78% of the general population (Cook et al., 1991). This rate was lower than that found by Blome (1997) who found that 63% of youth in foster care, completed high school, compared with 84% non-foster care children. More recently, a study conducted in the state of Washington found that 34% of youth leaving foster care obtaining a high school diploma or GED, and another 38% in foster care enrolled in educational or vocational programs. These school based findings are further supported by the 28% of foster care youth who had no current educational involvement (i.e., dropped out of school). In Ontario an estimated 44% of youth in care have a high school diploma compared with 81% graduation rate of same aged peers (OACAS, 2011). Therefore, although there is a substantial number of foster care youth who obtain a high school diploma or GED, this number remains low relative to the

general population. Furthermore, studies indicate that roughly 53% of foster care youth between the ages of 18 and 24 who are discharged from the foster care system are living below the poverty line (Cook et al., 2001), which speaks to the impact of lower academic outcomes on quality of life.

Research has demonstrated that a significant proportion of foster care youth exiting the foster care system are unprepared for independent adult life (Kluger, Maluccio, & Fein, 1989). These unprepared youth were identified as having poor job preparation/ skills, minimal work experience, and difficulties finding a job (Kluger, Maluccio, & Fein, 1989). Furthermore, these unprepared youth lacked self-support capabilities, including budgeting, finding and maintaining a household, accessing mental health and recreational services, and obtaining income assistance (Beyer, 1986; Cook, 1988; Kluger, Maluccio, & Fein, 1989). These results are significant and relevant to future quality of life, as studies have cited high school completion as contributing toward long-term wage realizations (Larson, 2010; Baker et al., 2001; Doland, 2001). Large-sample studies using wage data from Unemployment Insurance claims describe a consistent pattern of poor employment outcomes of former foster youth (Dworsky, 2005; Goerge et al., 2002).

Goerge and colleagues (2002) compared the employment of those youth who aged out of foster care and those who had previously been in foster care but who had been reunited with their family between the ages of 14 and 18, and non foster care youth from low-income families. Results indicated that 30% of those youth aging out of foster care in Illinois, 23% in California, and 14% in South Carolina had no earnings prior to their 18<sup>th</sup> birthday (Goerge et al., 2002). A study conducted between 1992 and 1998 in Wisconsin followed 8511 discharged foster youth and found that at least 80% were employed in at least one area (Dworsky, 2005). In terms of

salary, former foster youth had lower earnings, generally holding service sector jobs (Goerge et al., 2002). Results indicate that youth who aged out of foster care earned less money than either of the other two groups, with annual earnings of approximately \$6000 USD. This is lower than the poverty level required for a single individual. This is consistent with research showing youth in foster care report higher school dropout rates, and are three times more likely to be suspended due to problem behaviours than those not in care (Zima et al., 2000).

**Mental Health Outcomes.** Foster care alumni, or those who have exited the foster care system, have been associated with significantly higher rates of mental health problems relative to the general population (McMillen, 2005). In terms of psychopathology, Cook-Fong (2000) found that adults who were formerly in foster care had higher depression scores on the Centre for Epidemiologic Studies Depression Scale (CES-D) relative to their peers. Former foster youth also reported lower levels of self-esteem compared with controls, which has been associated with increased risk for depression and lower subjective well-being (Cook, 1992). Havalachak and colleagues (2007) conducted a study on those adults aged 19, 22, and 25 who had been in foster care as children. Results indicate that foster care alumni experienced higher levels of anxiety and depression at rates of 1.4 and 2 times greater than the general population, respectively (Havalachak, 2007). Recently, Pecora et al. (2005) reported that lifetime and past year depression rates persist into adulthood, and may contribute to poor educational and employment outcomes.

In summary, the research on the long term academic and mental health outcomes of children in foster care raises significant concerns about their adjustment. Mastering basic academic skills and increasing education achievement can be a protective factor leading to improved adult outcomes, such as completing high school. This, in turn, can have significant

positive outcomes such as improved future employment and quality of life (see Trout et al., 2008). Therefore, interventions that target academic achievement may improve their overall future and well-being in terms of job prospects and improved mental health.

### **Remedial Methods of Instruction for Children with Academic Delays**

Both the Diagnostic Statistical Manual (DSM-IV) and the International Classification System of Diseases, 10<sup>th</sup> revision (ICD-10) have defined and classified learning disabilities into specific deficit domains that include reading, writing, and arithmetic (Fletcher, Lyon, Fuchs, & Barnes, 2007). One of the most common learning disabilities is reading disability (McKenna, 2003). Learning to read is critical for a child's current and future well being, yet many struggle to learn to read. A recent study of the prevalence of reading disability found that 17% of the population may suffer from such a disability (Shaywitz & Shaywitz, 2003). There is converging evidence to indicate that the most common form of reading disability is caused by weaknesses in the ability to process phonological features of language (Torgesen, Wagner, & Rashotte, 1997). These weaknesses produce delays in the development of phonological awareness, difficulties in speech perception, and reduce performance on measures of verbal short-term memory (Torgesen, Wagner, & Rashotte, 1997). These children have difficulties understanding and applying the alphabetic principle to help decode unfamiliar words. This interferes with the child's ability to derive meaning from the words read, reducing overall comprehension (Torgesen, Wagner, & Rashotte, 1997) and a student's overall school functioning (McKenna, 2003). Over the past 30 years, shifts in perspectives about what causes reading disabilities has affected the nature of remedial approaches that are implemented (Swanson, 1999). Phonological awareness is a core deficit associated with reading disability (Fletcher et al., 1994; Shaywitz & Shaywitz, 1992), and those children who display lower levels of phonological awareness are at risk for becoming poor

readers (Schneider, Roth, & Ennemoser, 2000). For this reason, those remedial programs that target phonological awareness tend to demonstrate better outcomes than those that target whole word or context (Torgesen, Wagner, & Rashotte, 1997). Children with weak phonological abilities show improved reading following phonological awareness interventions when compared to approaches using context or whole word reading interventions (Felton, 1993; Torgesen, Morgan, & Davis, 1992).

In the United States, there has been a recent imperative in the form of Comprehensive School Reforms to identify interventions shown to effectively raise student achievement (Ross et al., 2004). A recent meta-analytic study found direct instruction (DI) to be one of the top three effective models for urban and low-performing schools (Borman, Hewes, Overman, & Brown, 2003). DI conceptualizes academic performance as a complex skill set whereby children are taught each component skill needed to achieve a target behaviour (Ryder et al., 2006). Therefore, DI teaches children phonetic skills to increase their phonological awareness and improve their reading abilities. DI has demonstrated strong effectiveness in repeated studies which have generalizability and an overall magnitude of effect size of  $d = +0.21$  (Borman, Hewes, Overman, & Brown, 2003). The other two methods found to demonstrate higher degrees of effectiveness than DI were the Success for All program and the School Development Project. Each of these efficacious approaches will be further elaborated on.

The Success for All program is an achievement-oriented program for children between the ages of kindergarten through to grade 8 who are considered at risk of failing. This program was developed in 1987, and is administered at school (Slavin & Madden, 2001). This program relies on the premise that every child can learn to read, and as such the program's primary goal is to ensure that all children who receive this program will develop reading skills that reach grade

level or above by the time children reach grade three (Wells, Blendinger, & Greene, 2000). In terms of specifics, this program contains a research-based school-wide curriculum component which occurs during reading periods and involves students being regrouped across ages so that each reading class contains students at the same reading level (Slavin, & Madden, 2001). The reading program for those in grades 2 through 6, involves students reading novels where there is an emphasis on cooperative learning including partner reading, identification of characters, settings, problems and problem solutions in narratives, story summary, writing, and direct instruction in reading comprehension skills (Slavin & Madden, 2001). There are assessments that occur every eight weeks, a focused ability group, one-to-one tutoring for students struggling with reading, a family support team, and a program facilitator (Slavin & Madden, 2001).

A vast amount of research has accumulated to support the efficacy of the Success for All program in yielding increased reading achievement levels compared with other reading programs (Slavin, Madden, Dolan, & Wasik, 1996). These evaluations have typically focused on the assessment of student outcomes on standardized achievement measures (Madden, Slavin, Christie, & Karpouzis, 2001). In addition, several studies have demonstrated the applicability of the Success for All program among diverse students. Specifically, culturally diverse urban schools have begun implementing this program and are finding significant educational improvements among students (Fashola & Slavin, 1998; Slavin & Madden, 2001). The Success for All program was implemented in Texas to target academic differences between minority and majority students. It was found that the achievement gap between Caucasian students, African American, and Latino students was reduced using this school-wide model (Slavin & Madden, 2001).

A second effective instructional intervention is the School Development Project (SDP), which is a more multisystem approach to education reform. SDP was designed to be a collaborative process of systemic reform and school improvement where connecting children and adults in their lives becomes an integral part of rebuilding foundational learning (Cook, Habib, Phillips, Settersten, Shagle, & Degirmencioglu, 1999). SDP's goal is to help children develop along multiple pathways by involving parents, school staff, and community members in a holistic manner (Cook et al., 1999). The focus of SDP is the child's cognitive development as well as physical, social, psychological, moral, and speech/language development. There are three core mechanisms of this approach consisting of a school planning and management team, student and staff support team, and a parent program (Cook et al., 1999). The effectiveness of the SDP approach remains guarded as most of the evidence supporting its effectiveness comes from work done by the developer, Comer, or colleagues at Yale (Haynes, Emmons, Gebreyesus & Ben-Avie, 1996). Therefore, replication studies are required to ensure the effectiveness of SDP where no clear vested interest is present.

**Direct Instruction and Reading.** DI, which constituted one of the three most effective remedial programs, provides the foundation for the group-based academic intervention approach used in the current study. Within the classroom, DI requires teachers to model desired behaviour, provide feedback at each step, and assess whether further re-teaching is needed. Stahl et al. (1998) describes DI as being associated with three basic principles: (a) language being broken down into component parts and taught in isolation with no context, (b) teachers being highly directed, and (c) minimal input from students about what is taught. Building on the principles of DI, the implementation of DI includes the following components: (a) small-group instruction, (b) oral response in unison so that all children have the opportunity to respond; (c) rapid pacing with

limited breaks; (d) teachers carefully listening and watching students' oral responses; (e) correcting errors, and (f) transitioning extrinsic rewards to intrinsic ones that can act as incentives (Carnine, Silbert, & Kameenui, 1997). In essence, DI utilizes explicit teaching to promote reading mastery (Shippen et al., 2005).

It has been suggested that DI promotes on-task behaviour among students, which could simultaneously improve academic and social outcomes (McLaughlin & Williams, 1988). Studies have shown that by increasing on-task behaviour there is an indirect increase in academic performance (Hallahan, Lloyd, Koseiwics, Kauffman, & Graves, 1979; McLaughlin, 1982). In terms of increasing on-task behaviours in academic programming, combining DI methods with contingency management procedures, such as contracts, self-graphing, self-determination of goals, and token economy have been suggested as a way to increase the effectiveness of DI (Blackwell et al., 1995; Shapiro, 2004). Research that combined DI and contingency management in the form of a token economy has been found effective at improving academic outcomes for children with disabilities, those judged to be at risk for school failure, and the general population of middle school students (Dolezal, 2007).

A meta-analysis found support for the efficacy of DI programs for improving academic achievement for students with learning disabilities (Borman et al., 2003). Furthermore, studies have also provided support to the benefits of DI programs for young high-risk children (Cole, Dale, Mills, & Jenkins, 1993), and children in foster care (Flynn et al., 2010). However, as evidenced by the literature, there is a limited focus on the efficacy of DI for children in foster care populations. As previously reported, children in care (foster or residential settings) share similar academic achievement deficits found among other populations, such as learning disabilities and EBD. Due to the paucity of research comparing the effectiveness of DI programs

for the current population of interest, further research examining the effectiveness of DI with foster care children is clearly needed.

Coleman and Vaughn (2000) reviewed eight reading intervention studies implemented for students with EBD who were between kindergarten and grade 6. Interestingly, only three of the eight studies included students younger than third grade, which some consider to be a critical age for learning to read. Findings from this review support the efficacy of teacher-led DI and tutoring (Coleman & Vaughn, 2000). Coleman and Vaughn (2000) conducted a focus group with teachers of students identified as EBD as a means of discerning which approaches were most successful. The focus group included eight teachers who taught reading to elementary school students with EBD for a minimum of an hour a day. Teachers varied in their teaching experience with a range from one to 27 years. The focus group was done to supplement the study findings. Teachers identified student's fear of failure as a barrier to engaging them in reading, as students will refuse a task unless certain they will succeed. Therefore, teachers highlighted the importance of maintaining high levels of engagement and reducing student's anticipation of failure (Coleman & Vaughn 2000). The teacher-led DI and tutoring were considered the most effective instructional strategies for teaching reading to those students with EBD based on the outcomes of the focus group (Coleman & Vaughn, 2000).

A relatively recent quasi-experimental study investigated the differential effects of DI reading programs for 55 seventh grade students performing two or more years behind in reading and thus considered to be struggling in school (Shippen et al., 2005). This study found that after six weeks of DI, students showed gains in reading efficiency, reading rate, reading accuracy, and reading fluency (Shippen et al., 2005). These results, however, produced moderate effect sizes for pre-post tests,  $d = .40$ , and across the types of gains assessed. The Gray Oral Reading Test

(GORT-4) was individually administered to each student to assess reading rate, reading accuracy, reading fluency, and reading comprehension. Results indicated that a moderate effect was obtained for reading rate and reading accuracy,  $d = .45$ , however these moderate gains may be attributed to the short duration of the program (Shippen et al., 2005). Longitudinal studies have been conducted to assess the long-term implications for those who receive DI programs. One study found that students who received four years of DI beginning in kindergarten were able to read at approximately grade level or at the 49<sup>th</sup> percentile by grade 3; however, those receiving DI did not perform significantly better than comparison students on reading achievement (Mac Iver & Kemper, 2002). Furthermore, this study also examined those students new to the school, as mobility of students can be considered a factor that influences academic achievements (Kerbow, 1996), and has been postulated as contributing to children in care exhibiting reduced academic success (Blome, 1997). DI has been shown to be beneficial to mobile students, with the preliminary report finding one year reading comprehension gains being on average 6.4 Normal Curve Equivalent (NCE) points compared with 0.4 NCE gains for control students (Mac Iver, Kemper, & Stringfield, 2000). Mobile students consisted of fourth grade students new to a study school (Mac Iver, Kemper, & Stringfield, 2000). The NCE were developed by the United States Department of Education as a way of standardizing test scores. The mean is assigned a NCE of 50% and each unit of standard deviation is represented as a 21.06% increase or decrease from the mean. As the NCE is derived from a z-score, it is also considered to be based on a normal distribution.

The effectiveness of the DI program was also studied in second grade students, across a two year time period, with what the authors termed “basal reading programs” (Ashworth, 1999). The basal reading programs encompass reading programs typically encountered in academic

settings with a particular focus on meaning and whole word recognition (Ashworth, 1999). Those who received the DI intervention displayed between 5% to 13% higher achievement scores in areas of vocabulary (13%), Comprehension (8%) and language (5.4%) on the Iowa Test of Basic Skills than those who received meaning reading programs (Ashworth, 1999). Other studies support the efficacy of DI interventions on reading and achievement across different grades and ethnicities (Dowdell, 1996). Dowdell (1996) investigated DI among an entire minority sample of sixth grade students and found a statistically significant difference as the experimental group had a mean increase of 1.06 on reading achievement on the Iowa Test of Basic Skills compared with the control group increase of only 0.45. A limitation of this study, however, is that the conditions were not randomly assigned (Dowdell, 1996).

**Direct Instruction and Math.** The DI method has also been demonstrated as an effective method for teaching mathematics to students in both general and special education (Kelly, Gersten, & Carnine, 1990; Kitz & Thorpe, 1995; Hastings, Raymond, & McLaughlin, 1989; Wilson & Sindelar, 1999). Kelly, Gersten, and Carnine (1990) compared traditional basal instruction (instruction as usual) with a DI program using a videodisc for students trying to learn fractions. Specifically, the DI program was meant to teach fractions to high school students who were part of a remedial math class (Kelly, Gersten, & Carnine, 1990). Half of the participants in the remedial class were identified as having learning disabilities (Kelly, Gersten, & Carnine, 1990). The authors found that students who participated in the DI videodisc instruction performed at a high level when compared to students who received the traditional basal curriculum.

Scarlato and Burr (2002) compared traditional and DI programs across 20 weeks of math instruction for male students with learning disabilities in a resource setting. The students in the

DI group received immediate feedback and specific mastery criteria for both guided and independent practice. Though the sample size was extremely small ( $n = 6$ ), results on the standardized KeyMath-R measure indicate that those students assigned to the DI group performed significantly better relative to their peers (Scarlato, & Burr, 2002).

The majority of studies have focussed on students with disabilities and tried to improve mathematic abilities via DI and within specialized programs such as resource classrooms (Butler et al., 2003; Scarlato & Burr, 2002; Test & Ellis, 2005). One study explored implementing a DI program within the structure of a general classroom setting. Overall students demonstrated improvements that were statistically and educationally significant. Students were able to master basic fraction skills over seven weeks of the instruction programming, and required fewer instructional lessons (Flores & Kaylor, 2007). Specifically, one third of students in the intervention performed below 50% at pre-test and reached 90% at post-test; while 86% of students performed above 75% on post-test measures of fraction abilities (Flores & Kaylor, 2007). The importance of this study was that it extended the effectiveness of DI interventions to include the general education setting.

Although the previous studies highlight the effectiveness of DI in improving the math skill area of fractions, studies have also been conducted to support the effectiveness of DI on solving math related word problems (Darch et al., 1984; Jones et al., 1985). Darch et al. (1984) compared the effectiveness of a DI approach to that of a basal-math approach for teaching fourth graders to solve word problems. The results indicated that students who were taught using DI performed significantly higher on the post-test than those who were taught by more traditional methods. Another study conducted by Wilson and Sindelar (1991) implemented a DI program for students with learning disabilities. The results showed that the DI approach led to superior

performance when compared to the basal approach. Further analysis of this third grade sample revealed that although students with learning disabilities improved at post-test, these students were still performing below grade level for average third graders, solving 3.69 fewer addition and subtraction word problems (Wilson & Sindelar, 1991).

Recently, the Teach Your Children Well (TYCW) program (Maloney, 1998), which utilizes a DI model, has been implemented using one-on-one instruction with foster parents (Flynn et al., 2012). This program took place from 2007-2010 focusing on the short-term educational outcomes of foster care youth. A total of 77 youth in grades 2 through 7, were enrolled in the study between 2007 and 2008. Those randomly assigned to the tutoring intervention received individualized tutoring from their primary adult caregiver. Those in the wait-list control group received the intervention the following year. The intervention consisted of the TYCW program, which is based on DI and uses highly structured teaching materials. The aim of TYCW is to accelerate learning of those disadvantaged youth in areas of reading, language, and arithmetic. Preliminary results from this study provided initial support for tutoring by foster parents. Specifically, these foster children made statistically significant gains in reading and math, with medium effect sizes of  $d = .46$  for math and  $d = .39$  for sentence comprehension (Flynn et al., 2009).

**Individual versus Group-Based Instruction.** Several meta-analytic studies have been conducted to explore the effectiveness of tutoring programs as a supplement to classroom teaching. Generally, one-to-one tutoring has been empirically validated for students considered at risk for school failure or those diagnosed or identified with a learning disability (Elbaum, Vaughn, Hughes, & Moody, 2000). One-to-one tutoring has been provided by a variety of individuals including teachers, volunteers, and college students (Butler, 1991). However, limited

studies exist that contrast one-to-one tutoring programs with potentially more cost effective small group interventions. The meta-analytic study of Elbaum, Vaughn, Hughes, and Moody (2000) were able to find two studies in the literature between 1975 and 1998 that compared one-to-one intervention with small-group interventions. Both studies focused on the Reading Recovery (RR) program which includes elements of DI focused on directed reading. This model was developed out of New Zealand designed to be implemented within academic settings (Clay, 1987; Reynolds & Wheldall, 2007). The RR program is an intensive, one-to-one tutoring program for those identified to be at risk for literacy difficulties. However, like other programs, RR is an early intervention program that aims to target those with literacy difficulties within the first-year of schooling (Askey et al., 2003; Reynolds & Wheldall, 2007). One such study compared an RR intervention implemented for 30 minutes daily at school for the duration of one year against Project READ, an intervention method that emphasizes phonics (Acalin, 1995). Though Project READ includes components of DI, it is a multi-sensory approach utilizing verbal, auditory, kinaesthetic and tactile approaches that moves teachers away from repetition and practice to teaching critical literacy (Acalin, 1995). Those students in the Project READ condition received instruction in groups of two to five for 30 minutes daily for one year. Acalin (1995) found no significant difference between those who received individual or one-to-one instruction compared to those in the group-based intervention. These results are echoed by Evans (1996 as cited by Elbaum et al., 2000) who also found no advantage for one-to-one interventions compared with group-based tutoring programs. A study conducted by Vaughn et al. (2003) also emphasized the utility of small group instruction for reading comprehension and fluency. This study found that small groups consisting of no more than three second grade students were comparable to direct one-to-one instruction for supplemental reading.

**Ethnicity.** There is a growing population of young Aboriginal Canadians that warrants prudent exploration regarding the role that ethnic identity may play in academic achievement. More specifically, according to Canadian Census (2006), 48% of the Aboriginal population in Canada is younger than 24 years old, which is in contrast to the 31% of the non-Aboriginal population (Statistics Canada, 2006). Intergenerational trauma, forced separation and colonialism have created and sustained a power imbalance that may contribute to differences in rates of foster care placements among Aboriginal Canadians. Currently in Thunder Bay, the Aboriginal population (consisting of First Nations, Metis, and Inuit) has shown a similar increase from 8,200 in 2001 to 10,055 in 2006, growing by 23% (Statistics Canada, 2006). As research has shown academic achievement deficits are pronounced in the child welfare population, considering the unique features of such a population is important. It is estimated that Aboriginal children comprise close to 80% of children living in out-of-home care, including foster care, group care, and institutional care in some Canadian provinces (Trocme, Knoke, & Blackstock, 2004). These statistics are contrasted by reports that Aboriginal children in Canada comprise 5% of the general population in Canada (Human Resources Development/Statistics Canada, 1996). These statistics clearly attest to the over-representation of Aboriginal children in the child welfare system. There are limited studies that address discrepancies in academic achievement between Aboriginal and non-Aboriginal children in care. One study, however, found that non-Aboriginal children and youth scored higher in reading, writing and numerical skills than Aboriginal youths in grades 4, 7 and 10 (Mitic & Rimer, 2002). In addition, Aboriginal children in continuing care (CCC) had the lowest rates of reading, writing, and numeracy scores on the Foundation Skills Assessment (FSA) (Mitic & Rimer, 2002).

An Australian study examined the effectiveness of DI among Indigenous children. Maggs and Moore (1978) found that Indigenous children achieved a 'normal' rate of academic skill development while receiving DI. The gains, however, were not as significant for the Aboriginal children compared to their non-Aboriginal counterparts for measures of comprehension and vocabulary (Maggs & Moore, 1978). Based on these preliminary results of DI among minority and Aboriginal students, and due to the large representation of Aboriginal youth in the welfare system, further attention and research is warranted. The extension and effectiveness of a group-based DI program aimed at improving academic achievement in Aboriginal children would extend the current understanding of DI effectiveness.

### **Present Study**

The current randomized controlled study sought to evaluate the effectiveness of a small group-based educational intervention for children in foster care. Although past research has demonstrated the magnitude of the problem of low academic achievement among this population, few studies have rigorously evaluated potential treatments. Therefore, this project sought to increase the breadth of knowledge in evaluating an intervention that has been shown to be effective within a one-to-one tutoring design (Flynn, Marquis, Paquet, Peeke, & Aubry, 2012). This study utilized a small group format of four children being taught by tutor volunteers over a 30-week intervention period. The TYCW program was chosen because it is not based on a school-wide implementation process or systemic change in teaching environments but can be done in a small group-based tutoring format outside of the school setting and hours. Furthermore, tutors were selected to deliver the intervention, as tutoring interventions have been shown to be more empirically supported. Specifically, in a comprehensive literature search spanning English, Swedish, Danish, or Norwegian studies, found only eleven interventions

aimed at improving school achievement among foster care children aged 6 to 15 years (Forsman & Vinerljung, 2012). Though there is limited intervention research that has been done in this area, tutoring programs are the best established educational intervention to date for young people in care (Forsman & Vinerljung, 2012). As these research objectives will unfold within a culturally diverse community, it is prudent to determine the impact of ethnicity on a group-based DI intervention. Therefore, incorporating a sample that is inclusive of Aboriginal Canadians will increase the relevance and cultural significance of the study. The working hypotheses of the study are as follows:

1. It is expected that the evidence-based TYCW group intervention will be effective at increasing children's academic achievement as represented by increased scores at post-test relative to the control group for academic skills (WRAT-4).
2. The effectiveness of the intervention may be moderated by several variables including child's residential stability (number of foster care homes), stability of school environment (number of schools child has attended), student's severity of inattention; and youth's academic self-concept. It is expected that children will show less improvement if they measure high on residential instability, inattention, and academic self-concept.
3. Research has found associations between academic achievement and behavioural and clinical psychopathology, such as depression and anxiety. Therefore, it is further hypothesized that changes in academic achievement will be negatively correlated with measures of clinical psychopathology across both foster-care and control children. Clinical psychopathology will be examined using the externalizing and internalizing broad domains on the Parent version of the ASEBA. Furthermore improved academic

change scores will be positively correlated with academic self-efficacy (Harter self-concept scale) at baseline.

4. It is expected that the group-based intervention will not only increase academic achievement on standardized testing, but also demonstrate academic improvements in the classroom setting. Therefore, those in the DI educational intervention group will show increased classroom academic performance relative to the wait-list control condition as assessed by the Academic Competence Evaluation Scale (ACES; DiPerna & Elliott, 1999).
5. It is expected that the DI educational intervention group will be effective at decreasing children's behavioural and psychopathological problems as represented by decreased scores at post-test in comparison to the control group on the Parent version of the ASEBA.

## **Method**

### **Participants**

Children were eligible to participate in the study if they were in foster or kinship care, behind in their academic achievement but not intellectually challenged (i.e.  $IQ > 70$ ), and were able to remain in the study for the full 30 weeks of the intervention. Children were also required to be in grades 1 to 8, inclusive, and exhibited sufficient behavioural control to participate in a small group instruction format, based on case workers clinical judgment. Given the unique cultural make-up of the local community, a majority of the participating foster children were of Aboriginal background increasing cultural significance and generalizability of the study. During the two years of program implementation, 101 youth were referred by their child welfare case workers to participate. Table 1 summarizes the demographic characteristics of the 101 children

at baseline. Participants were between the ages of 6 and 13 ( $M = 9.93$  years,  $SD = 1.9$ ) and in grades 1 through 8 ( $M = 5.03$ ,  $SD = 1.9$ ). Fifty-one foster children were randomly assigned to receive the group-based tutoring intervention (59.2% male, 83.7% Aboriginal) and 50 to the control group (55.6% male, 73.3% Aboriginal). In addition, ethical approval was obtained from the local university Research Ethics Board (see Appendix A) along with support from both child welfare organizations (see Appendix B) prior to the commencement of the study.

Randomization, carried out by the program Research Randomizer, occurred with all referrals prior to any direct contact or standardized testing with the youth. As consent was obtained from all case-workers, who represent the legal guardians for these children in care, children were randomized to reduce any bias associated with baseline testing results. Group size was not equivalent at baseline as two children were inappropriately referred to the program, but this was not discovered until after random assignment. One youth displayed superior academic skills and did not require tutoring while a second youth had such severe behavioural difficulties that baseline testing with the WRAT-4 could not be completed. Neither youth commenced the study and were not included in the current sample of 101 youth.

## Measures

**Demographic Information Face Sheet.** Child welfare case-workers were asked to provide demographic information on those children referred to the study. Referral information included the child's age, gender, ethnicity, and overall life stability (i.e., length of time in care, number of foster care moves, age of first contact with the child welfare system, number of schools, length of time at current school) (see Appendix C).

**Wide Range Achievement Test: 4<sup>th</sup> Edition (WRAT-4).** The WRAT-4 (Wilkinson & Robertson, 2006) was used to measure academic achievement across four dimensions including

reading, spelling, sentence comprehension and mathematics. Numerous validity studies have been carried out on this academic measure. The WRAT-4 has been frequently used in measuring students' reading and math skills and provides population based comparison on academic achievement levels. The WRAT-4 is standardized and norm-referenced, with all scores converted to standard scores with a mean of 100, and a standard deviation of 15. As there are two alternative forms (Blue and Green), the Blue Form was used at pre-test (September-October, 2010 and 2011), while the Green Form was used at post-test (May, 2011 and 2012), with all scores expressed as standard scores. The WRAT-4 test manual reports internal consistency coefficients ranging from .87 to .96, and both high convergent and concurrent validity (Wilkinson & Robertson, 2006).

As previously stated, the WRAT-4 has four subtests including Word Reading, Spelling, Sentence Comprehension, and Math Computation. Word Reading measures letter and word decoding by word recognition and identification. Spelling measures the ability to encode sounds into written form by use of a dictated spelling format containing both letters and words. Sentence Comprehension measures the ability to gain meaning from words and to understand and comprehend ideas and information within the sentences. Math Computation measures the ability to perform and execute mathematical computations by counting, identifying numbers, solving simple oral problems and calculating written math problems. In administering the WRAT-4, the order was as follows: Spelling, Reading, Sentence Comprehension, and Math Computation. The foster children's WRAT-4 standard scores were computed from their raw scores and indicated how their level of educational achievement compared with the standard scores ( $M = 100$ ,  $SD = 15$ ) of children of the same chronological age in the general population.

**Achenbach System of Empirically Based Assessment (ASEBA).** The ASEBA parent version is a measure used to obtain reports from parents, other close relatives, and/or guardians regarding children's competencies and social/emotional problems. Parents provided information for 20 competence items covering their child's activities, social relations and school performance. The ASEBA Parent form includes a 118-item checklist of problem behaviours that parents and teachers rate as not true (0), somewhat true (1) or very true (2) of their child/student over the past 6 months. The psychometric properties of the CBCL have been well established (Achenbach & Rescorla, 2001).

**The Conners' ADHD/DSM-IV Scale- Parent version (CADS-P).** This is a measure used to differentiate children with Attention Deficit/Hyperactivity Disorder from nonclinical children between the ages of 3-17 years. Foster parents completed the 26 item form which took approximately 5 minutes to complete (Conners, 2008).

**The Self-Perception Profile for Children.** This is a 36 item measure of self-worth across different contexts that include scholastic competence, social acceptance, athletic competence, physical appearance, and behavioural conduct (Harter, 1985). The current study, however, was only interested in the scholastic competence subscale as a means of defining a youth's academic self-concept. Each subscale has six items, and responses range from "really not true for me" to "really true for me" (Shevlin, Adamson, & Collins, 2003).

**Academic Competence Evaluation Scale (ACES).** To determine whether gains made as part of the intervention translate into the academic classroom, teachers were given the ACES. This academic measure is a 60 item teacher rating used to assess students academic competence across five domains: academic skills, study skills, academic motivation, interpersonal skills, and academic self-concept (DiPerna & Elliott, 1999). Teachers were asked to rate students across a

5-item Likert-type scale on frequency (1 = never to 5 = almost always), quality (1 = far below grade level to 5 = far above grade level expectations), and importance (1 = not important to 5 = very important). The ACES has good psychometric properties with high internal consistency ranging from .98-.92, and a 6 month test-retest reliability ranging from .92-.70 (DiPerna & Elliott, 1999). Teachers were asked to fill out the ACES at pre, and post-test.

**Fidelity Checks.** To ensure that DI instruction was implemented consistently and with fidelity across tutoring groups, tutors were required to routinely measure student progress and send in student progress to Michael Maloney for tracking purposes and to ensure that students were progressing adequately. Specifically, tutors measured sound fluency (i.e., the number of sounds read from a list of sounds per 30 seconds), word fluency (i.e., the number of words read from a word list per 30 seconds), and story fluency (i.e., the number of words read from a story in one minute). In addition, tutors also recorded the numbers of lessons completed by each student for both math and reading. This data was then entered into a spreadsheet and sent to Mr. Maloney for monitoring. Volunteer tutors were also expected to consult with Michael Maloney on a monthly basis as recommended by the developer of the TYCW program, Michael Maloney.

### **Procedure**

The implementation and evaluation of the group-based DI tutoring intervention project was a three-year process. The first year involved the formation of a steering committee (2009-2010) which included front-line and senior management representation from both Aboriginal and non-Aboriginal child welfare organizations in the community. The current author was brought on board to assist in the evaluation of the intervention, which was planned to occur over a two-year period. Planning meetings occurred on a regular basis, every two to three weeks, prior to the beginning of the first year of intervention in September, 2010. Dr. Robert J. Flynn and Michael

Maloney were also included on some of the first year planning meetings as consultants.

Information sessions were also held with child welfare case workers, foster parents, and other community stake holders prior to the commencement of the intervention in September, 2010.

Children in long-term out-of-home care referred by their child welfare case-workers were randomly assigned to either the wait-list control or tutoring DI conditions. All case-workers and foster caregivers of both intervention and control youth received an overview of the program and were invited to attend one of several meetings that explained the program in greater detail. Children were asked to assent to participate, while both child welfare case-workers and foster caregivers provided consent for each youth's participation in this study. Once participants were identified and the necessary informed consent obtained, baseline assessment measures were obtained, including demographic information (see Appendices D-H).

**Group-Based Tutoring.** Within the tutoring intervention program, children were assessed on a measure of word fluency, used in the TYCW program, and placed into small tutoring groups of three or five children according to skill level. There were a total of 16 tutoring groups across both year one and two of the study. The first year of the group-based tutoring groups ran over a 25-week time frame, from September 2010 until April 2011, for 2 hours each week, with either one or two tutor volunteers running each group. There were eight tutoring groups in the first year, and eight tutoring groups in the second year of this study. The second year of the group-based tutoring ran 29 weeks, from September 2011 until May 2012, following the same format as year one. While a 30-week intervention was planned, scheduling conflicts and volunteer tutor availability limited the number of weeks in which the intervention could run. Each session followed the basic structure of Michael Maloney's TYCW curriculum, which uses DI and behaviour management to improve the educational attainment of children.

Volunteer university students were recruited to run the weekly tutoring program. Prior to working with the children, the tutors completed two full days of training with the tutoring developer, Michael Maloney. Tutors were required to collect performance data at each tutoring session. This data comprised the fidelity checks and consisted of sound fluency (e.g. number of sounds read from a list of sounds per 30 seconds), word fluency (e.g. number of words read from a list per 30 seconds), and story fluency (e.g. number of words read from a story in 1 minute). This data was compiled into a weekly spreadsheet that was sent to Mr. Maloney. Throughout the course of the study, tutors had their performance monitored by Michael Maloney who served as an ongoing consultant. All volunteers received an honorarium at the middle and end of the tutoring program.

Participants in both the wait-list and intervention groups had their academic abilities assessed on two occasions, prior to and following the completion of the program, using the WRAT-4. The results represent a compilation of the data collected over a two year evaluation. Furthermore, additional measures of inattention, behavioural adjustment, and classroom academic functioning were collected as secondary measures.

**Analysis.** All data collected were analyzed using SPSS version 19.0. Frequencies were analyzed to ensure that data was free of errors. Histograms were generated to check the subscales of the WRAT-4, ASEBA, and ACES at pre- and post-intervention for outliers, skewness and kurtosis. All pre- and post-subscales were within acceptable limits of normalcy.

An a priori power analysis was conducted by means of the G\*Power 3.1 computer program (Faul, Erdfelder, Lang, & Buchner, 2007) to determine the required sample size needed to detect an effect for an analysis of covariance (ANCOVA) carried out via multiple regression,

with a medium effect size ( $f^2 = .15$ ), with an alpha level of .05 and statistical power of .80. It is estimated that we required a total sample size of approximately 55 children in total.

## Results

### Equivalence of Intervention and Control Groups at Pre-test

There were no statistically significant differences ( $p > .05$ ) between the intervention and wait-list control groups at pre-intervention in terms of gender, ethnicity, age (intervention group:  $M = 9.79$ ,  $SD = 1.83$ ; control group:  $M = 10.37$ ,  $SD = 1.54$ ), and the subtests of the WRAT-4. Therefore, the control and intervention groups were effectively randomized.

### Equivalence of Year-one and Year-two Cohorts at Pre-test

There were no statistically significant differences ( $p > .05$ ) between those youth from year one and those from year two at pre-intervention in terms of gender, and across the subtests of the WRAT-4. There was, however, a statistically significant difference between year one and two in terms of ethnicity, with all participants in year two being Aboriginal. However, given that there was no significant difference across both cohorts in terms of WRAT-4 subscale profiles, data was collapsed across both years into control and tutoring conditions.

### Attrition

During year one, from pre- to post-testing, three of the 33 (9.1%) foster children in the tutoring intervention group and none of the control group youth withdrew from the study. This attrition did not reduce equivalence across group conditions. The intervention ( $n = 30$ ) and wait-list ( $n = 35$ ) groups were still equivalent in terms of gender, ethnicity, age, and subtests of the WRAT-4 ( $p > .05$ ). With year-two, from pre to post-testing, five of the 16 (31.25%) foster children in the control group withdrew from the study, preferring to pursue tutoring elsewhere. This is contrasted by the one of 15 (6.67%) foster children in the tutoring intervention group that

withdrew due to mental health concerns prior to the commencement of the tutoring program. The overall rate of attrition across both years was 9.9%. When year one and two were combined, the intervention ( $n = 45$ ) and wait-list ( $n = 46$ ) groups were still equivalent in terms of gender, ethnicity, age, CADS, and reading, and spelling subtests of the WRAT-4 ( $p > .05$ ). Groups, however, were not equivalent across the WRAT4 subscales of sentence comprehension,  $t(77.05) = 2.5, p = .01$ ; mathematics,  $t(89) = 2.14, p = .04$ ; and academic self-concept,  $t(89) = 2.02, p = .05$ . Specifically, those in the intervention condition had lower scores at pre-test for sentence comprehension ( $M = 86.64, SD = 14.71$  vs.  $M = 93.30, SD = 9.94$ ), mathematics ( $M = 77.91, SD = 10.19$  vs.  $M = 82.67, SD = 11.06$ ), and academic self-concept ( $M = 14.13, SD = 3.94$  vs.  $M = 15.70, SD = 3.43$ ). Furthermore, both conditions did not differ in terms of all ASEBA and ACES subscales at baseline. Therefore, remaining analyses were conducted across those students who completed the study from pre to post-testing, for the intervention ( $n = 45$ ) and wait-list ( $n = 46$ ). Overall, pre-test equivalence of the groups is the main intended analysis for both group equivalence and attrition analyzes.

## Outcome Results

**Hypothesis 1.** In order to take into account potential clustering effects among the different tutoring groups, multilevel modeling was used (Tabachnick & Fidell, 2007). Essentially, variance in student response to the tutoring intervention may be a function of the program (i.e., TYCW), but may have also been affected by differences that naturally occur across each small tutoring group. Multilevel modeling takes into account these dependencies by estimating the average response associated with each tutoring group (intercepts) as well as group differences in associations (slopes) between predictors and outcome measures. Condition (intervention and wait-list control) and baseline academic achievement scores (word reading,

sentence comprehension, spelling and math) were entered as fixed effects in the multilevel model. When the predictor of group was entered rather than as individual observations, it improved the random intercept and slope model for word reading,  $\chi^2(1, N = 91) = 4.99, p < .001$ . Thus, taking into account tutoring groups improved the model beyond that produced by considering variability in individuals. The adjusted marginal means, as displayed in Figure 1 and Table 2 show that those who received the tutoring intervention had significantly higher word reading scores on the WRAT-4 relative to their peers in the wait-list condition, even when adjusted for pre-intervention scores.

In accordance with the recommendations of the What Works Clearinghouse (WWC, 2008) Procedures and Standards Handbook (version 2.0), Hedge's  $g$  was used to compute effect sizes that were unbiased by a small sample size. The effect size for word reading,  $g = 0.4$ , was above the threshold of 0.25 that WWC (2008) considers "substantively important". This suggests that the DI tutoring program had a small to moderate effect on word reading. Furthermore, as a means of illustrating the impact of tutoring, an improvement index was calculated from the Hedges'  $g$  (WWC, 2008, p. 24). The improvement index is conceptualized as the difference between percentile rank related to the tutoring group mean and the percentile rank corresponding to the control group mean, which is defined at the 50<sup>th</sup> percentile. The improvement index for reading, calculated from Appendix Z in Howell (2002), was 15.5% (e.g. 65.5<sup>th</sup> – 50<sup>th</sup> percentiles). In other words, the average foster child in the tutoring condition was at the 65.5<sup>th</sup> percentile of the control group, whose average was at the 50<sup>th</sup> percentile.

For the three remaining post-intervention academic outcome variables, including spelling, sentence comprehension and mathematics, entering the predictor as a group rather than

as an individual observation did not improve the fit of the model<sup>1</sup>. The use of multi-level modeling did not improve or add to statistical analyses. This may be due to low statistical power as the small number of tutoring groups ( $n = 16$ ) is more critical in determining power than the total number of individuals randomly assigned to receiving tutoring ( $n = 45$ ) that are nested within the tutoring groups themselves. Therefore, all remaining analyses were evaluated using an ANCOVA model, ignoring clustering of tutoring groups for spelling, sentence comprehension and mathematics.

An analysis of covariance (ANCOVA) with condition (control vs. intervention) as the between subject variable and WRAT-4 post-intervention outcome scores as the within-subject variable was completed. The pre-test WRAT-4 academic scores were entered as a covariate, via multiple regression, in order to control for the impact that pre-existing baseline differences on academic abilities could have on post-intervention academic outcomes. Due to attrition of four children in the intervention condition and six in the control condition, analyzes were performed based on the 91 youth who completed the study from baseline to post-intervention.

Analyses revealed a significant effect of condition on spelling,  $F(1, 88) = 5.617, p = .020$ , 2-tailed. The adjusted marginal means, as displayed in Table 2, and Figure 2, show that those who received the tutoring intervention had significantly higher spelling scores on the WRAT-4

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<sup>1</sup> For instance using mathematics as the outcome, the group model did not differ significantly from the model where all participants were considered as individual observations,  $\chi^2(1, N = 91) = 650.119 - 648.133 = 1.986, p > .05$ . There was no significant improvement in the fit of the model when the intercept, slope, and intercept and slope were allowed to be random and by tutoring group.

relative to those in the wait-list control condition, when adjusted for pre-intervention spelling scores.

The Hedge's  $g$  of 0.25 for spelling improvement falls at the WWC threshold of 0.25 and is therefore considered substantively important and a small to moderate effect size. The improvement index score was 9.9% (59.9<sup>th</sup> – 50<sup>th</sup> percentile). Furthermore, there was a significant effect of condition on mathematics,  $F(1,88) = 4.176, p = .044$ , 2-tailed. For mathematics, the Hedge's  $g$  of .34 was still substantively important and fell within the small to moderate range. The improvement index was 13.3% (63.3<sup>th</sup> – 50<sup>th</sup> percentile). The adjusted marginal means, as displayed in Table 2, and Figure 3, show that those who received the tutoring intervention had significantly higher math scores on the WRAT-4 relative to those in the wait-list control condition, when adjusted for pre-intervention math scores.

There was no statistically significant effect of condition on sentence comprehension,  $F(1,86) = 1.97, ns$ , after adjustment for covariate of baseline mean standard score. While improvements in sentence comprehension was in favour of the intervention group, the result was not statistically meaningful or important,  $g = .15$ , as both conditions showed improvements over time (see Figure 4). The improvement index was 6% (56<sup>th</sup> – 50<sup>th</sup> percentile).

**Hypothesis 2.** It was expected that the effect of condition on academic achievement would be moderated by overall stability, as operationalized as the number of primary placements and number of schools attended, and inattention symptom severity (CADS-inattention scale). However, only a limited number ( $n = 42$ ; 15 = wait-list and 27 = intervention) of inattention (CADS) behavioural measures were returned from Foster Parents. In contrast, the majority of stability measures were completed, such as residential stability ( $n = 82$ ; 40 = wait-list and 42 = intervention) and school stability ( $n = 68$ ; 34 = wait-list and 34 = intervention), while complete

data was obtained for all academic self-concept measures. Thus, the following analyses involving inattention as a moderator represents just under one-half of the sample, while the other moderator analyses was more representative of the full sample. Following the recommendation of Aiken and West (1991), the impact of the moderator variables was tested using coded multiple regression analyses. A coded multiple regression was conducted where the dependent variables (either change scores for the WRAT-4 subscales of Word Reading, Spelling or Mathematics) was regressed on the independent variable (condition), moderators (either inattention, or stability measures) and interaction variable (Baron & Kenny, 1986). Histograms were generated to determine the relative shape of distributions for all moderators. As all four moderators displayed normal distributions, one standard deviation above and below the mean was selected to ensure comparable numbers of subjects in each group. Therefore, three levels of moderators were computed including an average (medium), and one standard deviation above (high) and below (low) the mean levels for each moderation analysis.

There was a significant effect of school instability as a moderator between condition and word reading change score,  $F(1,64) = 4.25, p = .043$ . More specifically, there were significant effects of condition on word reading change scores when school instability was high and medium,  $\beta = 8.83, t(64) = 4.23, p < .001$  and  $\beta = 5.77, t(64) = 3.94, p < .001$ , respectively (see Figure 5). But no significant effect of condition on word reading change scores at low school instability levels,  $\beta = 2.72, t(64) = 1.31, p = .19$ . There were no significant effects of school instability as a moderator between condition and spelling, math and sentence comprehension change scores respectively (see Table 3).

There was also a significant effect of inattention as a moderator between condition and reading change score,  $F(1,28) = 4.46, p = .044$ . More specifically, there was a weak trend

towards an effect of condition on word reading change scores when inattention symptoms were high,  $\beta = 5.27, t(28) = 1.71, p = .09$ . But no significant effect of condition on word reading change scores at medium and low inattention symptom levels,  $\beta = .57, t(28) = .26, p = .8$  and  $\beta = -4.15, t(28) = -1.32, p = .2$ , respectively. This indicates that inattention symptom severity moderates the effects of condition on reported word reading change scores, such that effects are only seen when higher levels of inattention symptoms are present (see Figure 6). There were no significant effects of inattention as a moderator between condition and spelling, math and sentence comprehension change scores respectively (see Table 4).

There were no significant effects observed across residential instability moderation analyses that were conducted. For instance, there were no significant effects of residential instability as a moderator between condition and word reading change score,  $F(1,78) = .21, p = .65$  (see Figure 7). There were also no significant effects of residential instability as a moderator between condition and spelling, math and sentence comprehension change scores respectively (see Table 5).

Finally, there were no significant effects observed across academic self-concept moderation analyses that were conducted. For instance, there were no significant effects of academic self-concept as a moderator between condition and word reading change score,  $F(1, 87) = .29, p = .59$  (see Figure 8). There were also no significant effects of academic self-concept as a moderator between condition and spelling, math and sentence comprehension change scores respectively (see Table 6).

As school instability and ADHD moderators were significant between condition and word reading change scores, a correlation matrix was conducted to determine whether these represent independent effects or an overall construct related to inattention and instability. There

were, however, no significant correlations obtained across these moderators suggesting that either there was not enough data to find an overall construct or that each moderator represents an independent effect.

**Hypothesis 3.** Pearson product moment correlations were conducted to evaluate the relationship between baseline behavioural and clinical psychopathology (i.e., ASEBA) and academic change scores among those who received the intervention. As those who received the tutoring intervention overall showed greater improvements on academic achievement, post-WRAT4 scores were subtracted from baseline WRAT4 scores across the four subscales: word reading, sentence comprehension, spelling and mathematics. Of the 68 correlations computed, only three correlations were found to be significant. Sentence comprehension change score was negatively correlated with withdrawn/depressed symptoms  $r(29) = -.39, p = .038$ . Mathematic change scores were also negatively correlated with attention problems  $r(31) = -.36, p = .044$ . Word reading change score was negatively correlated with social problems  $r(31) = -.37, p = .039$ .

Although Pearson product moment correlations were conducted to evaluate the relationship between academic achievement change scores and baseline academic self-concept, no significant correlations were obtained.

Exploratory pearson product moment correlation analyses were also conducted to evaluate the relationship between academic achievement change scores with behavioural and clinical psychopathology (i.e., ASEBA) across time among those in the intervention condition. Change scores were calculated for all ASEBA Syndrome Scales and DSM scales and correlations were then conducted against change scores on academic achievement subscales of the WRAT-4, essentially trying to determine whether change in academic achievement is

correlated with changes in behavioural and clinical psychopathology across time for youth. Change scores subtracted post scores from pre scores. Similarly, of the total 68 correlations that were computed four significant correlations were found. Sentence comprehension change score was significantly negatively correlated with externalizing problems,  $r(8) = -.89, p = .003$  and DSM oriented Affective problems scale,  $r(8) = -.87, p = .006$ . There were also trends towards significance with spelling change score being negatively correlated with attention problems,  $r(12) = -.56, p = .057$  and DSM oriented Conduct Disorder scale,  $r(8) = -.69, p = .057$ , respectively. However, given the number of correlations conducted and missing data there were minimal significant correlations and results.

**Hypothesis 4.** A selection-bias analysis was conducted to determine whether there were any statistically significant differences between those children who had ACES returned versus those who did not. Groups (those with ACES returned versus those not returned) were not equivalent across gender,  $t(88.97) = -2.55, p = .012$ , with the majority of returned ACES forms coming for male students (70.5% for returned vs. 44.7% for not returned). Groups were equivalent in terms of ethnicity, age, and all subtests of the WRAT-4 including reading, spelling, sentence comprehension and math subtests ( $p > .05$ ).

Multilevel modeling (Tabachnick & Fidell, 2007) was used to take into account the clustering effects among the different tutoring groups when evaluating whether the group-based intervention was effective at increasing student academic performance at school (ACES). Multilevel modeling estimated the average response associated with each tutoring group (intercepts) as well as group differences in associations (slopes) between predictors and outcome measures. Condition (intervention and wait-list control) and baseline school achievement as derived from the ACES (word reading, math, critical thinking, interpersonal skills, engagement,

motivation and study skills) were entered as fixed effects in the multilevel model. For all post-intervention school achievement outcome variables, entering the predictor as a group rather than as an individual observation did not improve the fit of the model<sup>2</sup>. The use of multi-level modeling did not improve or add to statistical analyses. Again, there may have been a lack of improvement in the fit of the multi-level models due to low power, not only from missing data, but from the relative small number of tutoring groups. Therefore, all analyses were evaluated using an ANCOVA model, ignoring clustering of tutoring groups. An analysis of covariance (ANCOVA) with condition (control vs. intervention) as the between subject variable and ACES post-intervention outcome scores as the within-subject variable was completed. The pre-test ACES scores were entered as a covariate, via multiple regression, in order to control for the impact that pre-existing baseline differences on school academic abilities could have on post-intervention school academic outcomes. Due to the limited amount of data returned, there were 29 of the 91 ACES measures returned from baseline to post-intervention. Analyses revealed a significant effect of condition on study skills,  $F(1, 26) = 4.45, p = .045$ , and a trend towards significance for critical thinking skills,  $F(1, 22) = 3.51, p = .075$  (see Table 7).

**Hypothesis 5.** Multilevel modeling (Tabachnick & Fidell, 2007) was once again used to account for the potential clustering effects among the different tutoring groups when evaluating whether the group-based intervention was effective at reducing children's behavioural and psychopathological problems as represented by scores on the ASEBA (parent version). Given the

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<sup>2</sup> For instance using study skills as the outcome, the group model did not differ significantly from the model where all participants were considered as individual observations,  $\chi^2(1, N = 29) = 189.878 - 189.664 = .214, p > .05$ . There was no significant improvement in the fit of the model when the intercept, slope, and intercept and slope were allowed to be random and by tutoring group.

limited amount of data returned, 22 of the 91 ASEBA measures returned from baseline to post-test, there were no significant effects observed nor did the use of multi-level modeling improve or add to statistical analyses beyond an ANCOVA ignoring clustering (see Table 8). Therefore, because of the significantly small number of ASEBA measures returned, it resulted in very low power and the ability to test this hypothesis was compromised.

### **Discussion**

The purpose of this study was to investigate the effectiveness of a 30-week group-based DI program on academic achievement among youth in foster care. Based on learning theories and academic remediation programs, DI was identified as a potentially beneficial model for improving academic achievement for children in care. Preliminary data has supported the effectiveness of DI with foster children when delivered in an individual modality (Flynn, Marquis, Paquet, Peeke, & Aubry, 2012). The current study extended these encouraging findings to the use of DI within a small group format for children in foster care. In addition, the beneficial effect of group-based DI intervention on psychosocial functioning, such as reduced psychopathology as determined by scores on the ASEBA, was also evaluated. The present study contributed to the growing body of literature on academic remediation programming for foster care youth. Given the large proportion of Aboriginal Canadian youth in the sample, the current study also had significant cultural implications.

### **Outcome Results**

**Hypothesis 1.** It was hypothesized that the evidence-based TYCW group tutoring intervention would be effective at improving children's academic achievement as evidenced by increased scores at post-test on the WRAT-4 when compared to a wait-list control group. The results of the analyses support this hypothesis for measures of word reading, spelling and

mathematics. Overall, the foster children who participated in this study possessed average level spelling skills, but below average word reading and sentence comprehension skills, and very low math skills as evidenced by standardized scores. The group-based DI intervention had statistically significant and positive effects on word reading ( $g = .40$ ), spelling ( $g = .25$ ) and math ( $g = .34$ ) skills that exceeded those attained from the normal course of development and schooling by the foster children in the matched control group. This suggests that the foster children experienced a positive impact and improvement in their word reading, spelling and math through the tutoring intervention. However, the effect size related to sentence comprehension was not meaningful and suggests that the tutoring intervention, as delivered in the current format, may not be helpful for foster children in this area. This preliminary finding will need further study in order to better understand the potential limitations of DI for the abilities assessed by sentence comprehension on the WRAT-4.

The current results are consistent with the positive conclusions reached by Ritter et al. (2009) in their systematic review and meta-analysis of tutoring by adults, which included college-age students who were comparable to the volunteer undergraduate university students used in the current study. The magnitude of the statistically significant effects found in the current study matched those reported by Ritter et al. (2009), but exceeded those reported by Shippen and colleagues (2005). Across various measures of reading, Ritter and colleagues (2009) found small to moderate and statistically significant effect sizes, using hedge's  $g$ , ranging from .18 to .42. These results are consistent with the effect size of 0.40 found for word reading in the current study. It may be that the small effect size ( $d = .24$ ) reported by Shippen and colleagues (2005) may reflect the reduced duration of their DI program, lasting only six weeks. when compared to the 25 (year one) and 29 (year two) weeks in this intervention. The pooled effect

size of .45 for spelling found in the Ritter and colleague (2009) meta-analysis was higher than the 0.25 hedge's  $g$  obtained in the current study, however, both are within the small to moderate range.

As the current study was modeled after the work of Flynn and colleagues and used the same DI instruction program, a comparison of outcome results is meaningful. Flynn and colleagues (2012), using a one-to-one instruction format by foster parents, found significant improvements in mathematics and reading comprehension, which is synonymous with sentence comprehension in this study. Reading comprehension was the academic domain not statistically significant in the current study. This discrepancy may be accounted for by the use of a different instruction model (ie., individual vs. group format) or may be related to some additional factors unknown at this time. For instance, Flynn and colleagues (2012) included 30 minutes of interactive reading between child and caregiver in addition to the DI component. As sentence comprehension is a higher order process requiring both reading and comprehension, including interactive reading time with an older adult or caregiver may enhance the benefits of DI and increase the benefits on the sentence comprehension subscale. Given the limited research of DI with foster children, further investigation will be needed. However, it is important to note that Ritter and colleagues (2009) reported similar results to the current study in the domains of sentence (reading) comprehension, with non-significant effect size of .18. Furthermore, the current study extended previous research as it relates to the effects of DI programming among culturally different groups, such as Aboriginal Canadians. As the sample included primarily Aboriginal children (78%), DI appears to be a promising instruction method used at improving word reading, spelling and mathematic skills.

**Hypothesis 2.** It was hypothesized that the child's overall degree of stability, severity of inattention and baseline academic self-concept would moderate the effectiveness of the intervention. Specifically, child's degree of stability included stability of living environment as represented by number of primary placements, and the stability of school environment, represented by the number of schools the child has attended. Student's severity of inattention symptoms was evaluated by parent reports on the CADS. Change scores were calculated for all academic achievement scores on the WRAT4, including word reading, spelling, sentence comprehension and mathematics. The results of the analyzes run contrary to the hypothesis, as children showed greater improvement if they measured medium or high on school instability, and higher inattention symptoms across measures of word reading.

Research has supported an association between instability and academic performance. Notably, Eckenrode and colleagues (1995) noted that 15-33% of academic performance variance among maltreated youth was due to high rate of school and residential changes. Another study found that school transfers (instability) has a positive association with attendance, with school transfers not associated with reading scores but with a slight negative relationship to math scores (Conger & Rebeck, 2001). Though the research has generally found that children from lower socioeconomic status non-Caucasian families are more affected by instability of school and residential placement (Mehana & Reynolds, 2004), research has not explored this within the context of Aboriginal Canadians who comprised the bulk of the current study's sample. Furthermore, school instability usually leads to reduced attendance, impeding a youth's access to the content of information taught in class. Therefore, it may be that those youth with high and medium rates of residential and school instability or moves, benefited the most from the tutoring as it provided access to content not previously consolidated or fully learnt at school. Therefore,

the current study suggests that children who have greater school instability or high inattention benefit the most from a structured DI program which includes behavioural reinforcement. This indicates that children with high school instability and inattention require more than what regular school programming offers. This finding is encouraging as it suggests that these children can benefit from remedial academic interventions. It also highlights the need to specifically and actively target these children for academic intervention with a program like DI.

The current study also found that youth at greater risk of inattention as evidenced by the CADS, benefited more from the tutoring intervention when compared to children with normal levels of attention. Research has shown that children and youth with ADHD show significant academic underachievement, poorer academic performance, especially in terms of reading and math (Biederman, Faraone, & Milberger, 1996) and overall educational difficulties (DeShazo, Lyman, & Klinger, 2002; Hinshaw, 1992; Fergusson, Horwood, & Lynskey, 1993). These findings suggest that ADHD symptoms, including hyperactivity and inattention may interfere with a youth's ability to learn subjects like math, word reading, and spelling. The current study, however, found that there was a trend towards the tutoring programme benefiting those with higher inattention ADHD symptoms, essentially those most at risk. One possible explanation for this result may stem from the DI programs use of a behavioural management and small-group approach. That is, youth with greater ADHD inattention symptoms were able to learn word reading because of the smaller instructor to student ratio and the operant reinforcement system which enhanced motivation to learn. Essentially this program may be more effective for those who present with the greatest risk. Alternatively, given the limited sample size of ADHD measures comprising the ADHD inattention index, it may be a spurious result. Additional studies

should incorporate a greater sample of ADHD measures to determine whether this finding is maintained.

### **Exploratory Results**

The missing behavioural (ASEBA) and school-based academic achievement (ACES) data presented such significant obstacles to the the validity of testing hypotheses 3, 4 and 5 that these results will therefore be considered exploratory in nature.

**Hypothesis 3.** Research has supported the link between poor academic achievement and increased social and behavioural problems, such as depression and aggression (Lundy, Silva, Kaemingk, Goodwin, & Quan, 2010; Shahar, 2006; Courtney, Dworsky, Ruth, Keller, Havlicek and Bost, 2005; Nolen-Hoeksema & Girgus, 1994). Therefore, it was hypothesized that changes in academic achievement indices, including word reading, spelling, math, and sentence comprehension, would be negatively correlated with measures of clinical psychopathology at baseline for those who received the tutoring intervention. However, only three correlations were significant and in the anticipated direction. An exploratory analysis was also conducted to evaluate the association between change scores for all subscales of the WRAT-4 and subscales of the CBCL, with post subtracted from pre-test scores. Notably, changes in spelling were significantly negatively correlated with attention problems and DSM oriented Conduct Disorder scale, while sentence comprehension was negative correlated with externalizing problems and the DSM oriented Affective problems scale of the Parent version ASEBA. This suggests that those with greater change in spelling scores were also identified by their caregivers as having less attention problems, and Conduct Disorder problems; while those identified as having greater change in sentence comprehension scores were identified as having less externalizing problems

and Affective Syndrome problems. However, caution should be taken when interpreting these results given the significant degree of missing behavioural data (i.e., ASEBA) and the lack of significant correlations obtained. Furthermore, while spelling and sentence comprehension showed two significant correlations each, most of the behavioural and psychopathology symptoms on the ASEBA were not significant.

Correlational analyses alone preclude attempts to establish causality, as the literature supports that depressive symptoms have been linked to subsequent poor academic achievement, and that academic problems have resulted in the development of depressive symptoms with the primary cause being negative reinforcement from caregivers and teachers (Lundy, Silva, Kaemingk, Goodwin, & Quan, 2010).

These results are supported by the literature that has shown that children with withdrawn and depressed symptoms exhibit decreased academic abilities (Hodges, & Plow, 1990). In terms of ADHD symptoms (impulsivity, hyperactivity and inattention), it may be that youth unable to understand academic tasks became more irritable and less academically engaged and then appear less inattentive. As proficiency with spelling requires an ability to read and an understanding of phonetics, improvement on spelling may have led to greater proficiency and less frustration allowing those students to be better able to attend and complete tasks.

As there was a limited sample of ASEBA forms returned, further studies are warranted to determine whether such moderate associations between behavioural and clinical psychopathology measures and academic performance are maintained.

**Hypothesis 4.** As the academic benefits of this group-based tutoring program should generalize to other areas of the child's life, it was hypothesized that improvements would be demonstrated in the classroom setting. Specifically, those receiving the tutoring were

hypothesized to show increased classroom academic performance across domains of the ACES, including word reading, math, critical thinking, engagement, motivation, study skills, and interpersonal skills, relative to the wait-list control students. Results indicated that those who received the tutoring were identified by their classroom teachers as showing improved study skills. According to DiPerna and Elliott (1999), the study skills subscale reflects behaviours and skills that facilitate the ability to process new information, such as work preparation, completion and review. Study skills are considered academic enablers and have been conceptualized as prerequisites for learning (Harvey, 1995). Given that the sample size for these analyses was very small, those effects found are meaningful. Therefore, though the current study did not find improvements in reading and math on the ACES, the results do lend credence to the tutoring program for improving study skills, which may eventually lead to improvements in those academic domains.

There was also a trend toward a significant effect of tutoring on critical thinking skills observed in the classroom. Specifically, youth who received tutoring had greater critical thinking skills reported at post-test according to their teachers. In other words, tutoring had a trending effect toward improved critical thinking skills. Critical thinking is considered a higher-order academic skill that is a central part of academic curricula at schools (DiPerna & Elliott, 1999). Most conceptualize critical thinking also in the context of transferring knowledge and skills learnt in one context to another (Abrami, Bernard, Borokhovski, Wade, Surkes, Tamim, & Zhang, 2008). This is paramount to the current study, as tutoring was delivered outside of classroom hours, however, the benefits of remedial academic tutoring should generalize to the classroom setting. However, like the results of the ASEBA, the reduced number of submitted

teacher ratings of classroom academic performance may have reduced the power to detect significant changes in other areas, such as reading and math.

**Hypothesis 5.** Finally, it was hypothesized that the group-based intervention would reduce children's behaviour problems and psychopathology as evidenced by decreased scores at post-test on the parent version of the ASEBA, relative to the control group. The results of the analyses were unable to substantiate this assertion, as there were no significant effects of group across the indices of the ASEBA. Similar to the classroom academic performance measure (ACES), there were reduced number of ASEBA parent versions ( $n = 22$ ) that were returned, making it difficult to detect significant changes due to reduced power.

Notably, anecdotal reports from tutors, foster parents and workers highlighted the secondary benefit of the tutoring program as a means of improving social behaviours and improving compliance (reducing oppositionality). An unanticipated finding involved youth who presented as shy and withdrawn with limited friendships at the outset of the study but emerged at the completion of the tutoring intervention with greater social abilities, friendships, and appearing more confident. The benefits of including a qualitative and/or quantitative component regarding social skills should be explored in further studies of small group DI instruction.

### **Lessons Learnt**

A number of lessons have been learnt over the course of these two years. One such lesson is the need to provide more extensive training to the tutor volunteers with a particular emphasis on completing fidelity checks and implementation of the behavioural management reward system. These lessons learnt are similar to those mentioned in Flynn et al., (2012), such as the need for more intensive training of tutors and the need to improve attention to implementation of the behaviour management system. In the current study, the emphasis of initial training was on

word reading and literacy, with less time devoted to the computer-based math skills and little on the implementation of the behaviour management reward system. Furthermore, as there was limited information provided during training on how to report fluency checks, it was difficult to determine which tutors were implementing the program with high fidelity versus those who were not. This may have reduced the dosage and/or balance of skills taught across each tutoring group and inadvertently reduced the actual effect size of the intervention. Therefore, with future training sessions, more time should be devoted towards the pragmatics and recording of fluency checks.

Given that there appears to be a decrease in performance from baseline to post-testing for spelling and word reading, specifically for those in the wait-list condition, it would be unethical to withhold tutoring in further studies. Furthermore, as there was no condition controlling for the effects of being placed in a structured program, it is difficult to distinguish between possible training effects (e.g., DI) from the effects of receiving structure and support for 25 or 29 weeks. Therefore, future studies should explore other available structured commercial remedial programs (i.e., Sylvan or Scholars), to try and tease apart whether DI itself resulted in the noted improvements across word reading, spelling, and math.

### **Limitations and Future Directions**

Significant limitations of the present study were largely related to the exploratory or secondary analyses and the lack of data. Specifically, though the study consisted of 91 youth from pre to post-test completion, roughly 22 forms were returned for the ASEBA parent version assessing psychopathology and 29 ACES forms from teachers used to determine school-based academic performance. Though some effects were obtained, the reduced number of forms reduced the statistical power of the findings, thereby affecting whether the results were

statistically significant. Therefore, though the intervention improved word reading on a standardized academic achievement measure (WRAT4), the reduced sample size and power resulted in an inability to demonstrate generalizability of the intervention effects to reading behaviours in the classroom. Furthermore, the ACES measure has strong face validity making it difficult to mask the nature of questions asked to teachers. Although the progress of students was monitored by the program developer Mr. Maloney through weekly fluency checks, this data was not collected for current research purposes and was therefore not included as part of the analyses, making it difficult to ascertain whether all tutors implemented the program in the same way and with enough dosage required. Furthermore, though all academic and psychopathological measures were standardized, these were not standardized on an Aboriginal Canadian population, which represented the majority of the sample.

In particular, since the participant sample consisted largely of Aboriginal children, the relative impact of culture on academic outcomes can be more clearly determined. However, based on the current results, which consisted of a sample of both Aboriginal and non-Aboriginal children, DI appears to be a promising instruction method.

The results generated from this academic intervention study will provide information for the research and government communities who strive to generate efficient and effective policies and curriculums, especially for those students with academic deficits. The effectiveness of this group-based DI model provides an additional cost-effective component for agencies and boards seeking to explore avenues for improving word reading, spelling and math for foster children who are behind academically. This is an encouraging finding which can make a life-long improvement in a vulnerable population of children if the proper resources are allocated to this need. Furthermore, the potential utility of examining whether those academic achievement gains

observed for word reading, spelling and mathematics are maintained at follow-up will need to be explored further, along with the potential moderating role of other individual difference factors, such as gender. Although the results from this study need further investigation and replication, those youth who received tutoring demonstrated significant improvements in word reading, spelling and math scores relative to their same aged control peers. To echo the sentiments of Forsman and Vinnerljung (2012) there is a great need for larger-sampled and randomized studies focused on educational interventions for children in foster care, as a means of establishing a greater body of empirically sound interventions. Though such an undertaking will require a substantial commitment and considerable government resources, DI appears to be an effective academic intervention for children in care.

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Table 1.

*Demographic characteristics of all youth originally referred to the study.*

			Frequency	Percent
Total Sample (N = 101)	Age (in years)	6	5	5
		7	7	6.9
		8	14	13.9
		9	15	14.9
		10	17	16.8
		11	17	16.8
		12	18	17.8
		13	8	7.9
		Ethnicity	Caucasian	18
Aboriginal	79		78.2	
Missing	4		4.0	
Grade	1	3	3.0	
	2	8	7.9	
	3	14	13.9	
	4	15	14.9	
	5	16	15.8	
	6	18	17.8	
	7	17	16.8	
	8	10	9.9	
Gender	Male	58	57.4	
	Female	43	42.6	
Primary Placements since last admission in care (#)	0	18	17.8	
	1	34	33.7	
	2	23	22.8	
	3	5	5.0	
	4	4	4.0	
	5	3	3.0	
	6	1	1.0	
	Missing	13	12.9	
Longest Stable Foster Home (years)	< 1 year	8	7.9	
	1 – 2 years	11	10.9	
	2 – 3 years	6	5.9	
	3 – 4 years	12	11.9	
	4 – 5 years	6	5.9	
	5 – 6 years	13	12.9	

Longest Stable Foster Home (years)	< 1 year	8	7.9
	1 – 2 years	11	10.9
	2 – 3 years	6	5.9
	3 – 4 years	12	11.9
	4 – 5 years	6	5.9
	5 – 6 years	13	12.9
	6 – 7 years	8	7.9
	7 – 8 years	7	6.9
	8 – 9 years	6	5.9
	9 – 10 years	7	6.9
	10 – 11 years	6	5.9
	missing	11	10.9

---

Table 2.

*Adjusted Post-intervention Means of WRAT-4 subscales conditions holding Pre-intervention Means Constant.*

	Wait-list ( $n = 46$ )	Intervention ( $n = 45$ )
	<i>M</i>	<i>M</i>
Word Reading	88.98	93.62
Spelling	91.61	94.80
Math	80.43	84.27
Sentence Comprehension	91.08	92.78

Table 3.

*School instability as moderator between condition and academic achievement on the WRAT-4.*

School Instability	Word Reading		Spelling		Sentence Comprehension		Mathematics	
	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$
Low ( $n = 23$ )	2.72	1.31	2.44	.97	2.33	2.89	4.35	1.33
Medium ( $n = 22$ )	5.77	3.94*	3.74	2.11	8.27	15.92	4.64	2.01
High ( $n = 23$ )	8.83	4.23*	5.03	2.00	14.22	17.91	4.92	1.5

*Note: \* $p < .001$*

Table 4.

*Inattention as moderator for condition across academic achievement change scores of the WRAT-4*

Level of Inattention	Word Reading		Spelling		Sentence Comprehension		Mathematics	
	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$
Low ( $n = 11$ )	-4.15	-1.32	.69	.21	-.90	-.32	4.6	1.04
Medium ( $n = 10$ )	.57	.26	2.24	.99	.94	.48	4.38	1.42
High ( $n = 11$ )	5.27	1.71*	3.78	1.18	2.78	1.00	4.15	.95

*Note: \*  $p < .1$  (trend)*

Table 5.

*Residential instability as moderator between condition and academic achievement on the WRAT-4.*

Residential Instability	Word Reading		Spelling		Sentence Comprehension		Mathematics	
	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$
Low ( $n = 27$ )	5.92	3.06	3.51	1.61	3.82	1.82	5.29	1.85
Medium ( $n = 28$ )	5.29	3.91	3.88	2.53	3.33	2.26	6.53	3.25
High ( $n = 27$ )	4.67	2.42	4.25	1.95	2.83	1.35	7.77	2.72

Table 6.

*Academic self-concept moderating the effects of condition on academic achievement scores on the WRAT-4.*

Academic Self-Concept	Word Reading		Spelling		Sentence Comprehension		Mathematics	
	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$	$\beta$	$t$
Low ( $n = 30$ )	4.53	2.45	2.43	1.17	4.03	1.98	6.28	2.16
Medium ( $n = 31$ )	5.23	4.08	3.62	2.51	4.07	2.87	5.5	2.72
High ( $n = 30$ )	5.92	3.29	4.8	2.37	4.11	2.06	4.71	1.66

Table 7.

*Adjusted Post-intervention Means of ACES Subscales by Conditions Holding Pre-intervention Means Constant.*

ACES	Control ( $n = 17$ ) <i>M</i>	Intervention ( $n = 12$ ) <i>M</i>
Study Skills	32.53	38.16 *
Critical Thinking	32.17	37.55**
Reading	30.29	29.84
Math	20.40	21.75
Motivation	30.95	33.24
Engagement	23.76	27.43
Interpersonal	37.48	40.65

*Note:* \*  $p < .05$ . \*\*  $p < .08$ .

Table 8.

*Adjusted Post-intervention Means of ASEBA Clinical Subscales by Conditions Holding Pre-intervention Means Constant*

ASEBA	Control ( $n = 10$ ) <i>M</i>	Intervention ( $n = 12$ ) <i>M</i>
Anxious-Depressed	56.85	55.88
Withdrawn-Depressed	56.48	57.43
Somatic Complaints	57.26	56.28
Thought Disorder	61.37	57.02
Aggressive Behaviour	59.34	59.80
Attention Problems	63.52	64.24
Social Problems	57.43	57.81
Rule-Breaking Behaviour	57.68	61.85
Internalizing Problems	56.53	54.31
Externalizing Problems	57.48	58.94

Figure 1.

*Mean Standard Score Differences on Word Reading (WRAT-4) Holding Pre-Intervention Scores Constant.*

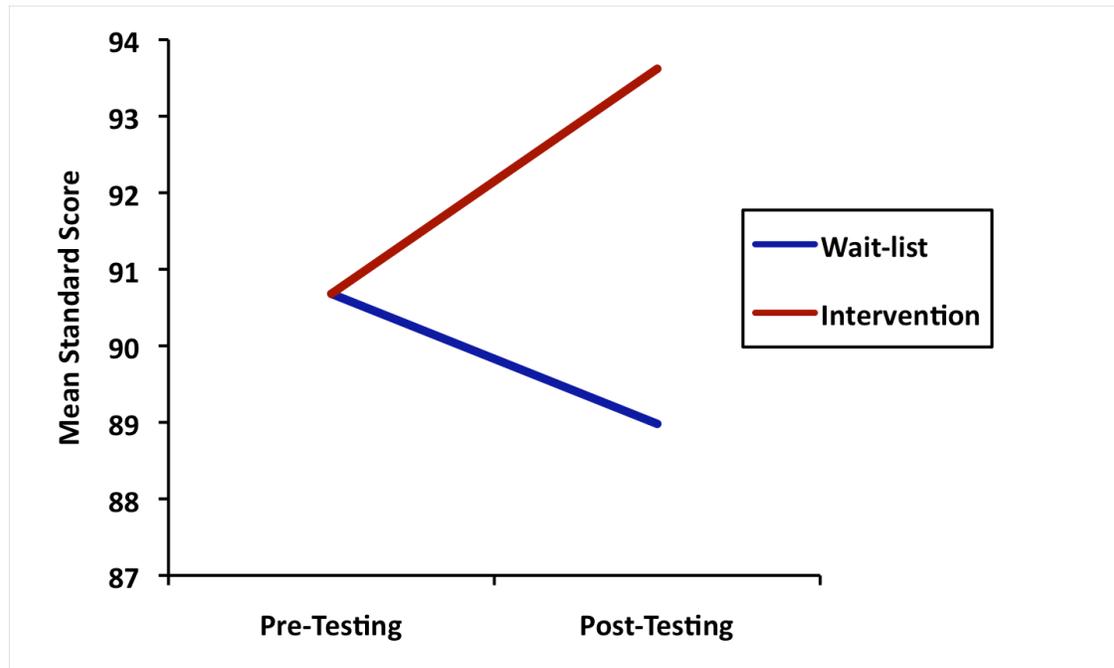


Figure 2.

*Mean Standard Score Differences on Spelling (WRAT-4) Holding Pre-Intervention Scores Constant.*

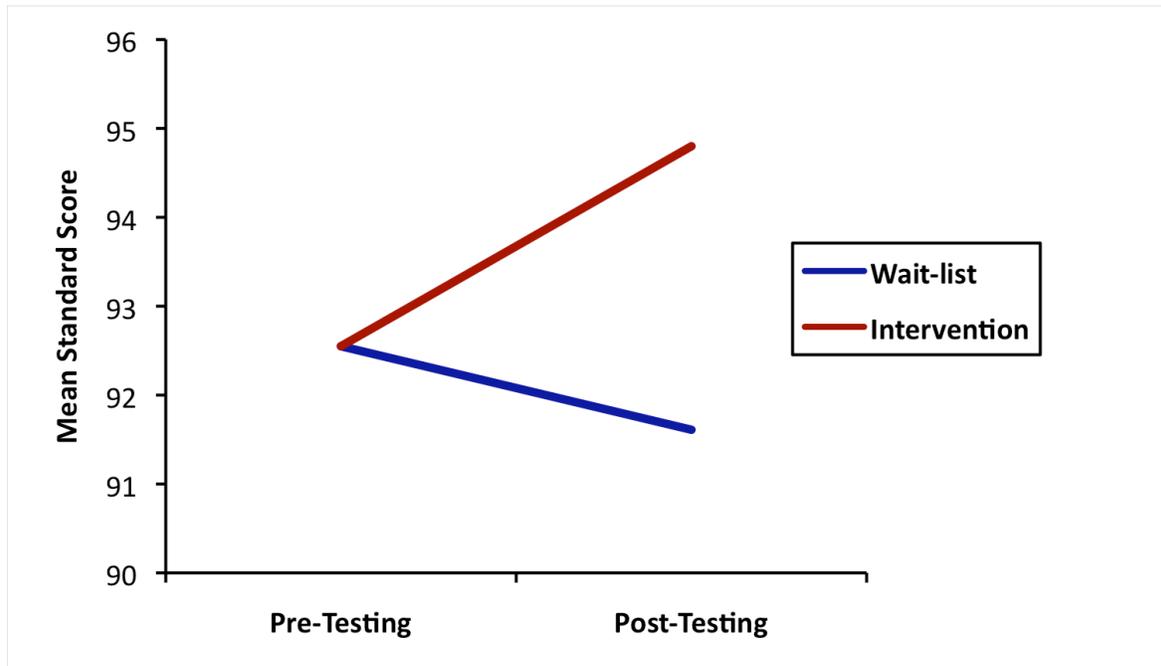


Figure 3.

*Mean Standard Score Differences on Mathematics (WRAT-4) Holding Pre-Intervention Scores Constant.*

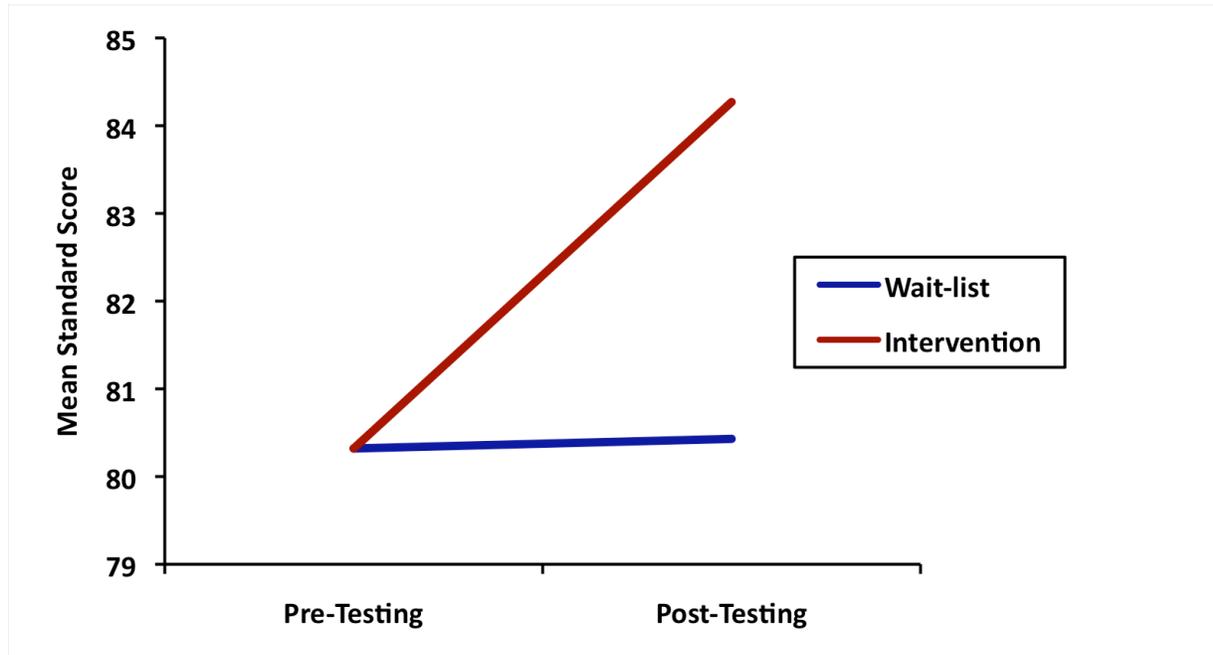


Figure 4.

*Mean Standard Score Differences on Sentence Comprehension (WRAT-4) Holding Pre-Intervention Scores Constant.*

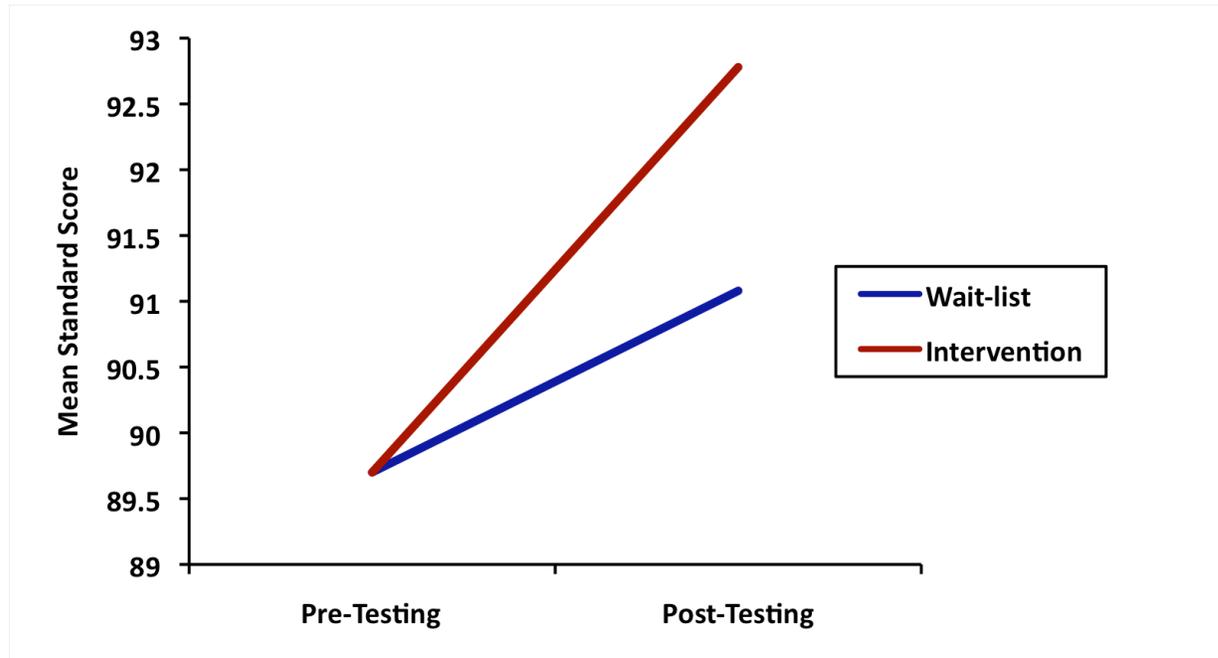
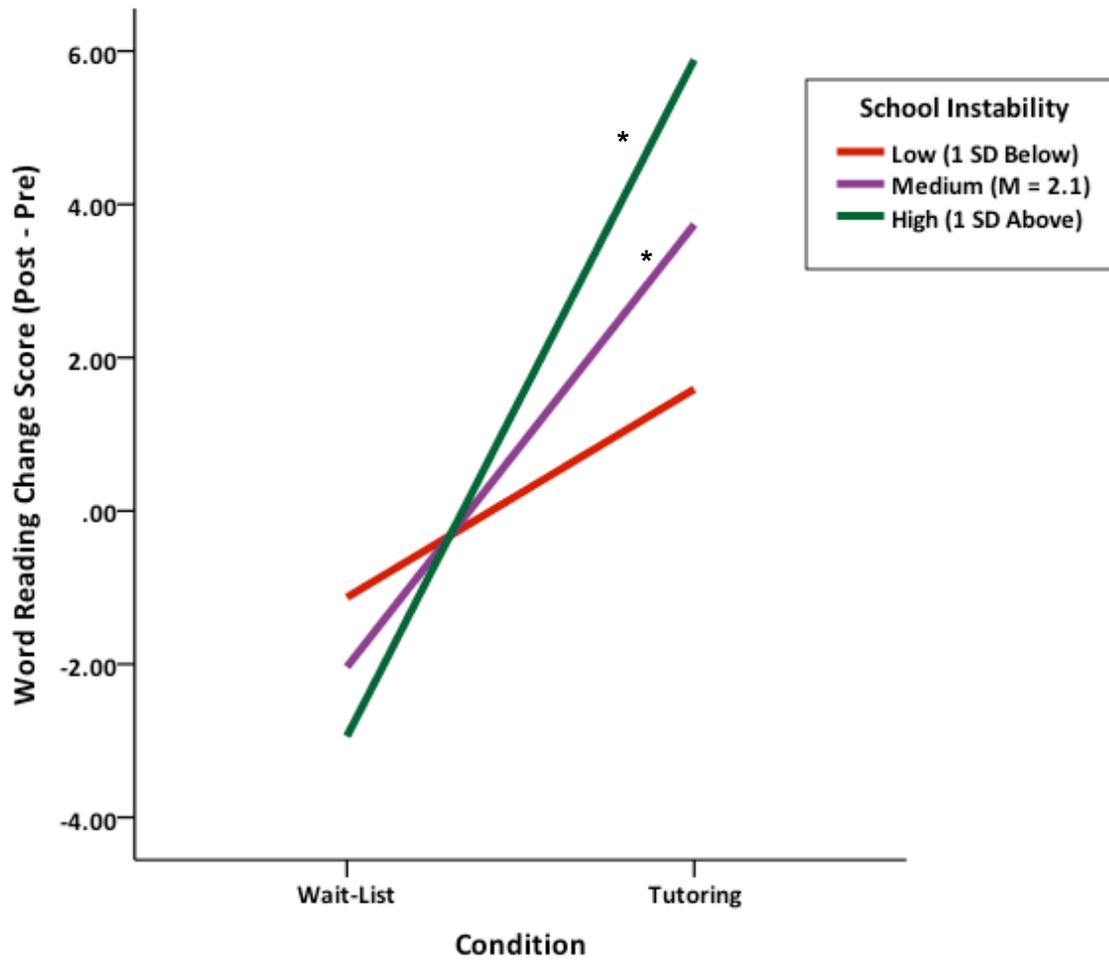


Figure 5.

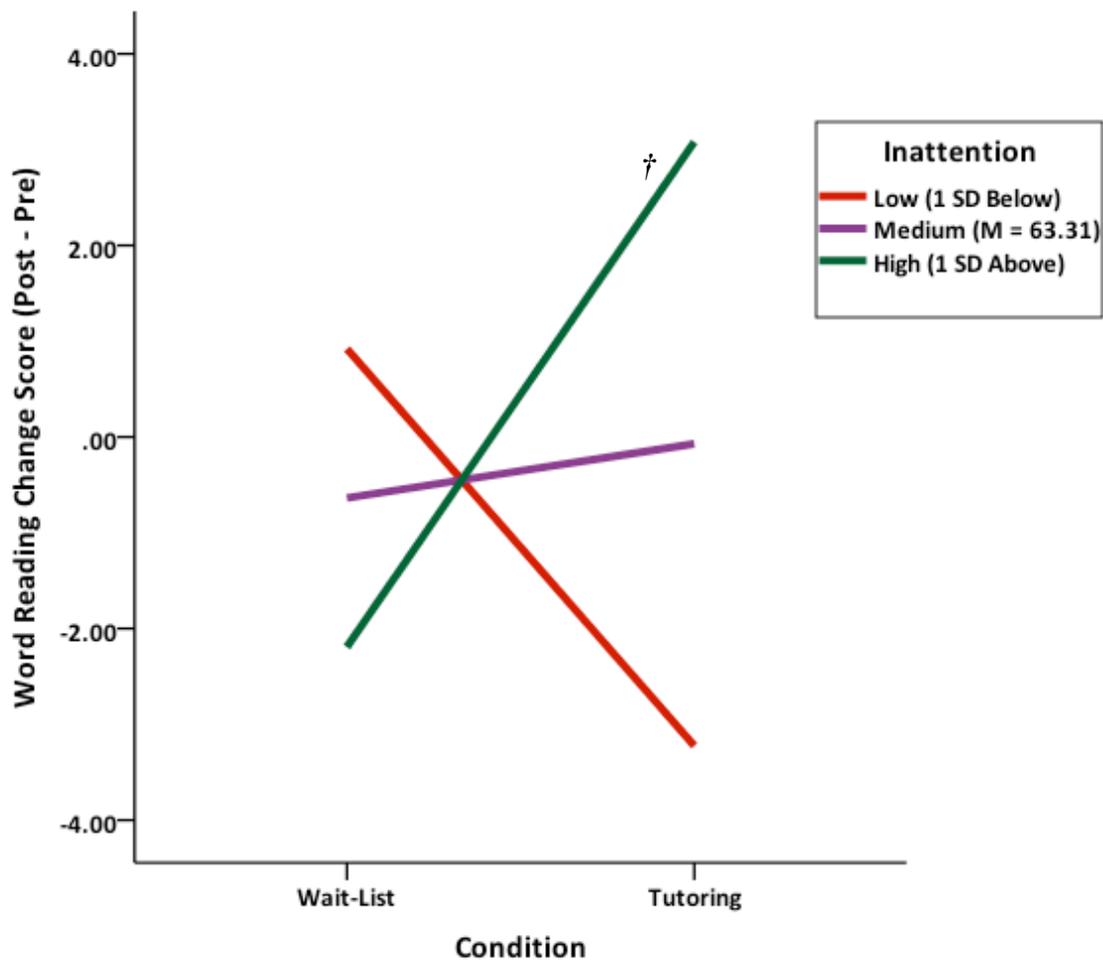
*School Instability Moderating Effects of Condition on Word Reading Change Scores on the WRAT-4.*



Note: \*  $p < .001$

Figure 6.

*Academic Self-Concept Moderating Effects of Condition on Word Reading Change Scores on the WRAT-4.*



Note: †  $p < .1$  (trend).

Figure 7.

*Residential Instability Moderating Effects of Condition on Word Reading Change Scores on the WRAT-4.*

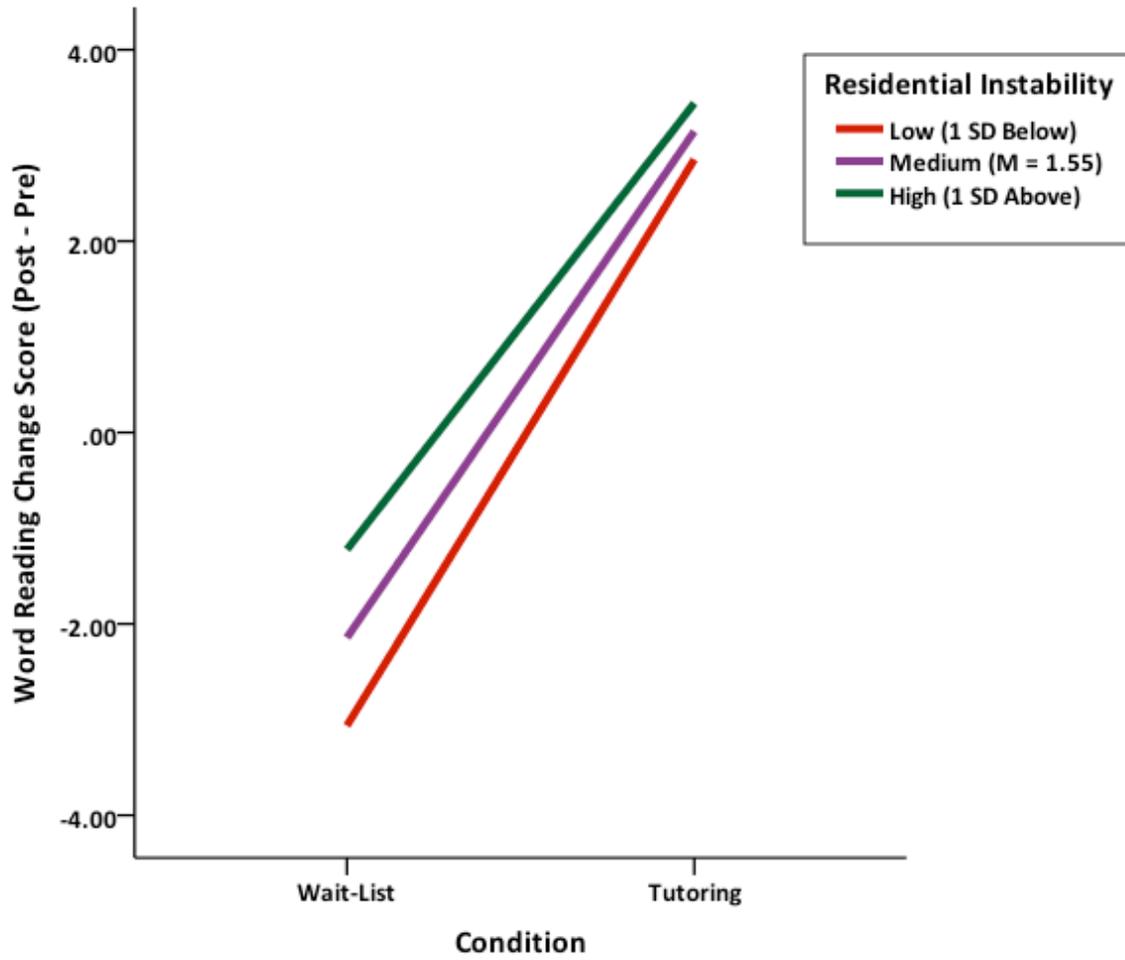
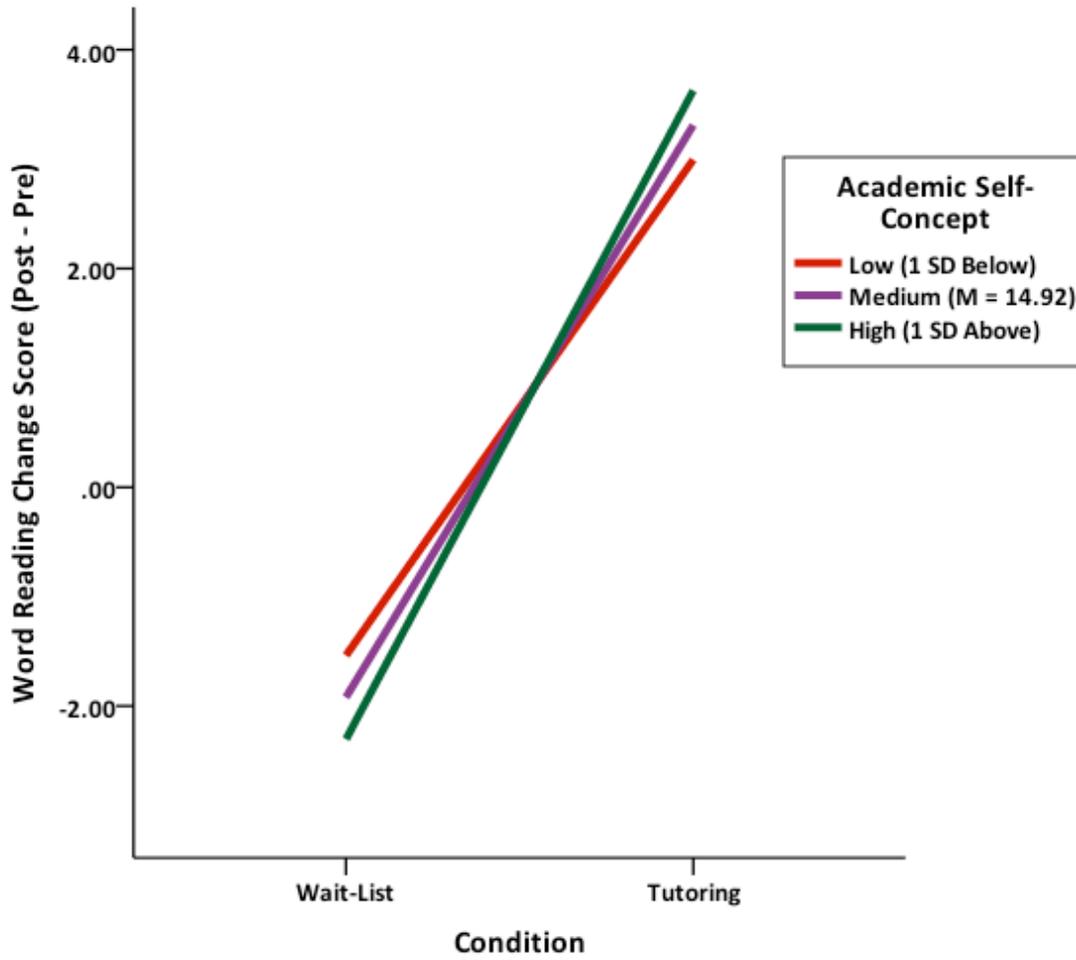


Figure 8.

*Academic Self-Concept Moderating Effects of Condition on Word Reading Change Scores on the WRAT-4.*



## Appendices

## Appendix A. Lakehead University Research Ethics Board Approval Letter

# Lakehead

UNIVERSITY

July 14, 2010

Office of Research

Tel (807) 343-8283  
Fax (807) 346-7749

**Principal Investigator:** Dr. Fred Schmidt  
**Co-Investigator:** Dr. Dwight Mazmanian  
**Student Investigator:** Julie Harper  
Psychology  
Lakehead University  
955 Oliver Road  
Thunder Bay ON P7B 5E1

Dear Dr. Schmidt:

**Re: REB Project #: 115 09-10/ROMEO #1460891**  
**Granting Agency name: N/A**  
**Granting Agency Project #: N/A**

On behalf of the Research Ethics Board, I am pleased to grant ethical approval to your research project entitled, "The Effectiveness of a 30-week Group-based Tutorial Direct Instruction Program for Long-term Foster-care Children: A Randomized Controlled Trial".

Ethics approval is valid until **July 14, 2011**. Please submit a Request for Renewal form to the Office of Research by June 14, 2011 if your research involving human subjects will continue for longer than one year. **A Final Report must be submitted promptly upon completion of the project.** Request for Renewal and Final Report forms are available at:

[http://research.lakeheadu.ca/ethics\\_resources.html](http://research.lakeheadu.ca/ethics_resources.html)

During the course of the study, any modifications to the protocol or forms must not be initiated without prior written approval from the REB. You must promptly notify the REB of any adverse events that may occur.

Completed reports and correspondence may be directed to:

Research Ethics Board  
c/o Office of Research  
Lakehead University  
955 Oliver Road  
Thunder Bay, ON P7B 5E1  
Fax: (807) 346-7749

Best wishes for a successful research project.

Sincerely,



Dr. Richard Maundrell  
Chair, Research Ethics Board

/bk

cc: Office of Research

## Appendix B. Child Welfare Organization Letters of Support



June 21, 2010

Dr. Fred Schmidt  
Adjunct Professor  
Department of Psychology  
Lakehead University  
Thunder Bay, Ontario

Dear Dr. Schmidt

**RE: Research entitled "The Effectiveness of a 30-week Group-based Tutorial Direct Instruction Program for Long-term Foster-care Children: A Randomized Controlled Trial"**

As members of the Steering committee for the "Tutoring toward Success" project, Dilico Anishinabek Family Care is invested in the completion of the aforementioned study. As part of the planning process for this research, we understand that this randomized design study is being completed by Ms. Julie Harper for her dissertation research which will be conducted over a two-year time period beginning in September, 2010.

Dilico is looking forward to the findings of this study anticipating that it will inform evidence based practice for our Aboriginal children in long term foster care.

We are writing to provide you with the support of our organization for the duration of the project.

We look forward to the ongoing partnership over the course of this study.

Sincerely

  
Donald Auger  
Executive Director

  
Susan Verrill  
Director of Child Welfare



*The* **Children's Aid Society**  
of the District of Thunder Bay

Mara Izzo  
President

Rob Richardson, MSW  
Executive Director

June 21<sup>st</sup>, 2010

Dr. Fred Schmidt, Adjunct Professor  
Department of Psychology  
Lakehead University  
955 Oliver Road  
Thunder Bay, ON P7B 5E1

VIA EMAIL & REGULAR MAIL

Dear Dr. Schmidt,

**RE: Research Entitled "The Effectiveness of a 30-week Group-based Tutorial Direct Instruction Program for Long-term Foster-care Children: A Randomized Controlled Trial"**

I am writing on behalf of The Children's Aid Society of the District of Thunder Bay to indicate our support for the aforementioned study with children in our long term foster care. We understand that this randomized design study is being done by Julie Harper for her dissertation research and will be conducted over a two-year time period beginning in September, 2010.

It is our experience that children in long term foster care struggle within the school setting and are often behind their peers in academic achievement. We believe that any effort to improve the academic achievement of these children is critical for their long term success. As a result, we are very interested in the results of this study and hope that it will provide us with information that will improve the life outcomes of these children in our long term care.

We look forward to collaborating with you and Julie on this study and are committed to the completion of the study.

Sincerely,

Rob Richardson, MSW  
Executive Director

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## Appendix C. Agency Referral Form

**Tutoring Toward Success  
Referral Information Form**

**Children who meet the following inclusion criteria can be referred into the study:**

- Must be in long term foster or kinship care
- Grades 1-8, inclusive
- Behind academically or an average student that may benefit from a tutoring program
- Not intellectually challenged (i.e. IQ greater than 70)
- Willingness to remain part of the study for 30 weeks.
- English as primary language.
- Able to manage a small group tutoring instruction (i.e, 4 students) after school hours.

**Instructions:** Please fill in the information below regarding a child you wish to refer.

**Referring Agency:**  CAS for the District of Thunder Bay  Dilico Anishinabek Family Care

**Child Name:** \_\_\_\_\_

**Child's D.O.B:** \_\_\_\_\_

**Gender:** \_\_\_\_\_

**Grade:** \_\_\_\_\_

**School:** \_\_\_\_\_

**CAS Worker's Name:** \_\_\_\_\_

**CAS Worker's phone #:** \_\_\_\_\_

**Ethnicity (mark all that apply):**

White                       African Canadian                       Aboriginal (First Nations, Métis)  
 Hispanic                       Asian                       Other (specify): \_\_\_\_\_

**Background Information**

1. Date of last admission into full time care: \_\_\_\_\_
2. Months in care prior to last admission for full time care: \_\_\_\_\_
3. Number (#) of primary placements: \_\_\_\_\_
4. Number (#) of primary placements since last admission: \_\_\_\_\_
5. Child's longest stable foster home placement (in months): \_\_\_\_\_

6. Has the child ever been in a residential out of home placement setting, as opposed to foster care:  Yes  No
- a. If yes, what was the child's longest placement in a residential setting (in months): \_\_\_\_\_
7. Does the child currently have contact with a bio-parent? :
- Mother  Yes  No; Father  Yes  No
- a. If yes, how frequent is the contact (per month): \_\_\_\_\_
8. Does the child currently have contact with extended family:  Yes  No
9. Does the child currently have contact with any siblings:  Yes  No

### Academic Information

1. How many schools has the child attended: \_\_\_\_\_
2. Do you know the child's grades in school:  Yes  No
- a. If yes, on average what are the child's grades (i.e. A, B, C, D, E, etc.):  
\_\_\_\_\_
3. Are they intellectually delayed (IQ less than 70):  Yes  No
4. Does the child have severe behavioural problems to the degree that it impedes group work or functioning:  Yes  No
5. Does the child have an Individual Education Plan (IEP):  Yes  No
6. Is the child receiving current communities services (i.e. counseling):  Yes  No
- a. If yes, list services: \_\_\_\_\_
7. Does the child have any known diagnoses (i.e. ADHD):  Yes  No
- a. If yes, list diagnoses: \_\_\_\_\_
- b. If yes, is the child on any medication (list kinds): \_\_\_\_\_
8. What is this child's preferred time to do the tutoring intervention (check only one):
- Monday - Friday from 4-6 pm
- Monday – Friday from 6- 8 pm
- Saturday from 10-12 pm
- Saturday from 1 – 3 pm

**Reason for Referral**

Please briefly describe why you feel this child is a good candidate for the current academic intervention. Please be sure to include relevant academic and behavioural information.

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**\*\*\*Please Attach Most Recent Report Card \*\*\***

*Appendix D. Cover Letter for Children's Aid Society [Lakehead University letterhead]*

Dear Children Services Worker (Guardian),

Numerous studies have shown that children in care fall far behind their peers in academic achievement. To address this issue, the Tutoring Toward Success steering committee will be evaluating a Group-Based Tutoring program (Teach Your Children Well) for children who are in foster care. While tutoring has been shown to be helpful in raising children's academic achievement, it is usually done in a one-to-one format. Our goal with this intervention study is to evaluate whether a more efficient small group tutoring format is also effective. To be sure that the intervention works, children must be randomly assigned to either the treatment intervention group or a waitlist control condition. Children who are placed in the waitlist condition, will be able to participate in tutoring services after the 30-week intervention is completed.

For each child who participates in this tutoring intervention study, the following will occur:

1. Each foster parent/care provider will be asked to fill out a behavioural checklist at three different times: beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
2. Standardized testing with your child will take approximately one hour to administer and will take place at three times: beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
3. Each child's teacher will be asked to complete a questionnaire rating the child's academic skills at the beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
4. Children placed in the control condition will not receive any tutoring services for the first 30-weeks of the study. They will be assessed at the beginning and the end of the 30 week, and 6 month follow-up time period. They will then be able to receive tutoring services at the end of the 30 weeks.

### Confidentiality

The academic testing results (WRAT4) at pre, post and follow-up will be submitted to the case workers. However, answers your child in care and foster parent/care provider provide to additional questionnaires will be kept confidential and the results and final report will not identify any individual children. The information will be held in a secure place at Lakehead University for a period of five years. Your child's participation in the study is completely voluntary. If you wish to withdraw at any time during the study, you are free to do so without consequence.

### Risks and Benefits

There is no expected risk for harm to yourself or your child by participating in the small-group tutoring intervention. However, those children randomly assigned to the control condition will have to wait 30 weeks to receive any tutoring intervention. This delay in intervention for the control children may be problematic for those in need of immediate help. Those convinced that the child cannot wait to receive immediate intervention, may benefit from using an alternative program. The results of this study will provide strong information about the effectiveness of this intervention program and will be central in shaping future academic interventions for children in care within Thunder Bay.

#### Contact Information

If you choose to participate, consent forms must be signed by you (Guardian), foster parent/care provider and an assent form by your child. Once these consents are signed, then your child may participate in this research project. Upon completion of this research, you are entitled to receive a summary of the research results. If you have any questions about this study or if you have any concerns, you may contact anyone listed below:

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Julie Harper, Ph.D. Candidate, Clinical Psychology, Lakehead University  
jharper@lakeheadu.ca

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Fred Schmidt, Ph.D., C. Psych.

Telephone: (807) 343-5016

Email: [fschmidt@childrenscentre.ca](mailto:fschmidt@childrenscentre.ca)

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Gail Quirion

Telephone: (807) 343-6142

Email: [Gail.Quirion@thunderbaycas.ca](mailto:Gail.Quirion@thunderbaycas.ca)

*Appendix E. Cover Letter for Children's Aid Society [Lakehead University letterhead]*

Dear Foster Parent/Care Provider,

Numerous studies have shown that children in care fall far behind their peers in academic achievement. To address this issue, the Tutoring Toward Success steering committee will be evaluating a Group-Based Tutoring program (Teach Your Children Well) for children who are in foster care. While tutoring has been shown to be helpful in raising children's academic achievement, it is usually done in a one-to-one format. Our goal with this intervention study is to evaluate whether a more efficient small group tutoring format is also effective. To be sure that the intervention works, children must be randomly assigned to either the treatment intervention group or a waitlist control condition. Children who are placed in the waitlist condition, will be able to participate in tutoring services after the 30-week intervention is completed.

### Study Requirements

Your child's participation in this tutoring intervention study will include the following:

1. You will be asked to fill out a behavioural checklist at three different times: beginning, end and 6 months after your child has completed the 30-week tutoring intervention.
2. Standardized testing with your child will take approximately one hour to administer and will take place at three times: beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
3. Each child's teacher will be asked to complete a questionnaire rating the child's academic skills at the beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
4. Children placed in the control condition will not receive any tutoring services for the first 30-weeks of the study. They will be assessed at the beginning and the end of the 30 week, and 6 month follow-up time period. They will then be able to receive tutoring services at the end of the 30 weeks.

### Confidentiality

The academic testing results (WRAT4) at pre, post and follow-up will be submitted to the case workers. However, answers your child in care and foster parent/care provider provide to additional questionnaires will be kept confidential and the results and final report will not identify any individual children. The information will be held in a secure place at Lakehead University for a period of five years. Your participation in the study is completely voluntary. If you wish to withdraw at any time during the study, you are free to do so without consequence.

### Risks and Benefits

There is no expected risk for harm to yourself or your child by participating in the small-group tutoring intervention.. However, those children randomly assigned to the control condition will have to wait 30 weeks or longer to receive any tutoring intervention. This delay in intervention for the control children may be problematic for those in need of immediate help. Those convinced that the current child cannot wait to receive immediate intervention, may benefit from using an alternative program. The results of this study will provide strong information about the effectiveness of this intervention program and will be central in shaping future academic interventions for children in care within Thunder Bay and the province of Ontario.

#### Contact Information

If you choose to participate, consent forms must be signed by you, your child's Children Service Worker and an assent form by your child. Once these consents are signed, then you may participate in this research project. Upon completion of this research, you are entitled to receive a summary of the research results. If you have any questions about this study or if you have any concerns, you may contact anyone listed below:

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Julie Harper, Ph.D. Candidate, Clinical Psychology, Lakehead University  
jharper@lakeheadu.ca

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Fred Schmidt, Ph.D., C. Psych.  
Telephone: (807) 343-5016                      Email: [fschmidt@childrenscentre.ca](mailto:fschmidt@childrenscentre.ca)

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Gail Quirion  
Telephone: (807) 343-6142                      Email: [Gail.Quirion@thunderbaycas.ca](mailto:Gail.Quirion@thunderbaycas.ca)

Foster Parent/Care Provider and Children Service Worker Consent Form [Lakehead University letterhead]

This study will examine how effective the Teach Your Children Well group based intervention is at improving the academic achievement of children in care. By providing my signature and initials on this form I am consenting to the participation of my youth and myself in this study and acknowledge that I have read and understand the information letter. I also agree to and understand that participation involves the following:

- To allow researchers to contact my youth and invite him/her to participate in this research project. If my youth does not give consent he/she will not participate in the research project as both the consent of myself (foster parent) and my youth are needed to participate.
- My youth will complete testing at three different time periods. These questions will ask about reading and math, and how my youth feels about school.
- I agree to fill out questions at three different time periods about how my youth behaves at home and answer four questions each week about my child's school work.
- Participation in research is voluntary and I may stop at any time.
- My child's teacher will fill out a questionnaire about my child's academic abilities at three different time periods.
- All of the information collected for this study will be kept in a secure place at Lakehead University for five years. After the 5 years, this information will then be destroyed.
- If I have any questions, I can contact the researchers, Julie Harper, at [jharper@lakeheadu.ca](mailto:jharper@lakeheadu.ca) or Fred Schmidt at 343-5016 ([fschmidt@childrenscentre.ca](mailto:fschmidt@childrenscentre.ca))
- If you have any concerns regarding your rights as a research participant, or wish to speak to someone other than a research team member about this research project, you are welcome to contact the:

Office of Research Ethics, Lakehead University  
1294 Balmoral Street  
Thunder Bay, Ontario P7B 5E1  
Phone: (807) 343-8283

*Please complete ...*

\_\_\_\_\_  
**Parent/Caregiver's Name** (please print)

\_\_\_\_\_  
**Youth's Name** (please print)

\_\_\_\_\_  
**Signature of Parent/Caregiver**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Youth's Primary Caseworker**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Witness**

\_\_\_\_\_  
**Date**

*Appendix F. Cover Letter for Dilico Anishinabek Family Care [Lakehead University letterhead]*

Dear Case Manager (Guardian),

Numerous studies have shown that children in care fall far behind their peers in academic achievement. To address this issue, the Tutoring Toward Success steering committee will be evaluating a Group-Based Tutoring program (Teach Your Children Well) for children who are in foster care. While tutoring has been shown to be helpful in raising children's academic achievement, it is usually done in a one-to-one format. Our goal with this intervention study is to evaluate whether a more efficient small group tutoring format is also effective. To be sure that the intervention works, children must be randomly assigned to either the treatment intervention group or a waitlist control condition. Children who are placed in the waitlist condition, will be able to participate in tutoring services after the 30-week intervention is completed.

For each child who participates in this tutoring intervention study, the following will occur:

1. Each foster parent/care provider will be asked to fill out a behavioural checklist at three different times: beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
2. Standardized testing with your child will take approximately one hour to administer and will take place at three times: beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
3. Each child's teacher will be asked to complete a questionnaire rating the child's academic skills at the beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
4. Children placed in the control condition will not receive any tutoring services for the first 30-weeks of the study. They will be assessed at the beginning and the end of the 30 week, and 6 month follow-up time period. They will then be able to receive tutoring services at the end of the 30 weeks.

### Confidentiality

The academic testing results (WRAT4) at pre, post and follow-up will be submitted to the case workers. However, answers your child in care and foster parent/care provider provide to additional questionnaires will be kept confidential and the results and final report will not identify any individual children. The information will be held in a secure place at Lakehead University for a period of five years. Your child's participation in the study is completely voluntary. If you wish to withdraw at any time during the study, you are free to do so without consequence.

### Risks and Benefits

There is no expected risk for harm to yourself or your child by participating in the small-group tutoring intervention. However, those children randomly assigned to the control condition will have to wait 30 weeks to receive any tutoring intervention. This delay in intervention for the control children may be problematic for those in need of immediate help. Those convinced that the child cannot wait to receive immediate intervention, may benefit from using an alternative program. The results of this study will provide strong information about the effectiveness of this intervention program and will be central in shaping future academic interventions for children in care within Thunder Bay.

#### Contact Information

If you choose to participate, consent forms must be signed by you (Guardian), foster parent/care provider and an assent form by your child. Once these consents are signed, then your child may participate in this research project. Upon completion of this research, you are entitled to receive a summary of the research results. If you have any questions about this study or if you have any concerns, you may contact anyone listed below:

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Julie Harper, Ph.D. Candidate, Clinical Psychology, Lakehead University  
jharper@lakeheadu.ca

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Fred Schmidt, Ph.D., C. Psych.

Telephone: (807) 343-5016

Email: [fschmidt@childrenscentre.ca](mailto:fschmidt@childrenscentre.ca)

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Rachel Adduono

Telephone: (807) 624-5845

Email: [RachelAdduono@dilico.com](mailto:RachelAdduono@dilico.com)

*Appendix G. Cover Letter for Dilico Anishinabek Family Care [Lakehead University letterhead]*

Dear Foster Parent/Care Provider,

Numerous studies have shown that children in care fall far behind their peers in academic achievement. To address this issue, the Tutoring Toward Success steering committee will be evaluating a Group-Based Tutoring program (Teach Your Children Well) for children who are in foster care. While tutoring has been shown to be helpful in raising children's academic achievement, it is usually done in a one-to-one format. Our goal with this intervention study is to evaluate whether a more efficient small group tutoring format is also effective. To be sure that the intervention works, children must be randomly assigned to either the treatment intervention group or a waitlist control condition. Children who are placed in the waitlist condition, will be able to participate in tutoring services after the 30-week intervention is completed.

### Study Requirements

Your child's participation in this tutoring intervention study will include the following:

1. You will be asked to fill out a behavioural checklist at three different times: beginning, end and 6 months after your child has completed the 30-week tutoring intervention.
2. Standardized testing with your child will take approximately one hour to administer and will take place at three times: beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
3. Each child's teacher will be asked to complete a questionnaire rating the child's academic skills at the beginning, end, and 6 months after your child has completed the 30-week tutoring intervention.
4. Children placed in the control condition will not receive any tutoring services for the first 30-weeks of the study. They will be assessed at the beginning and the end of the 30 week, and 6 month follow-up time period. They will then be able to receive tutoring services at the end of the 30 weeks.

### Confidentiality

The academic testing results (WRAT4) at pre, post and follow-up will be submitted to the case workers. However, answers your child in care and foster parent/care provider provide to additional questionnaires will be kept confidential and the results and final report will not identify any individual children. The information will be held in a secure place at Lakehead University for a period of five years. Your participation in the study is completely voluntary. If you wish to withdraw at any time during the study, you are free to do so without consequence.

### Risks and Benefits

There is no expected risk for harm to yourself or your child by participating in the small-group tutoring intervention.. However, those children randomly assigned to the control condition will have to wait 30 weeks or longer to receive any tutoring intervention. This delay in intervention for the control children may be problematic for those in need of immediate help. Those convinced that the current child cannot wait to receive immediate intervention, may benefit from using an alternative program. The results of this study will provide strong information about the effectiveness of this intervention program and will be central in shaping future academic interventions for children in care within Thunder Bay and the province of Ontario.

#### Contact Information

If you choose to participate, consent forms must be signed by you, your child's Children Service Worker and an assent form by your child. Once these consents are signed, then you may participate in this research project. Upon completion of this research, you are entitled to receive a summary of the research results. If you have any questions about this study or if you have any concerns, you may contact anyone listed below:

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Julie Harper, Ph.D. Candidate, Clinical Psychology, Lakehead University  
Jharper@lakeheadu.ca

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Fred Schmidt, Ph.D., C. Psych.  
Telephone: (807) 343-5016      Email: [fschmidt@childrenscentre.ca](mailto:fschmidt@childrenscentre.ca)

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Rachel Adduono  
Telephone: (807) 624-5845      Email: [RachelAdduono@dilico.com](mailto:RachelAdduono@dilico.com)

## Foster Parent/Care Provider and Case Manager Consent Form [Lakehead University letterhead]

This study will examine how effective the Teach Your Children Well group based intervention is at improving the academic achievement of children in care. By providing my signature and initials on this form I am consenting to the participation of my youth and myself in this study and acknowledge that I have read and understand the information letter. I also agree to and understand that participation involves the following:

- To allow researchers to contact my youth and invite him/her to participate in this research project. If my youth does not give consent he/she will not participate in the research project as both the consent of myself (foster parent) and my youth are needed to participate.
- My youth will complete testing at three different time periods. These questions will ask about reading and math, and how my youth feels about school.
- I agree to fill out questions at three different time periods about how my youth behaves at home and answer four questions each week about my child's school work.
- Participation in research is voluntary and I may stop at any time.
- My child's teacher will fill out a questionnaire about my child's academic abilities at three different time periods.
- All of the information collected for this study will be kept in a secure place at Lakehead University for five years. After the 5 years, this information will then be destroyed.
- If I have any questions, I can contact the researchers, Julie Harper, at [jharper@lakeheadu.ca](mailto:jharper@lakeheadu.ca) or Fred Schmidt at 343-5016 ([fschmidt@childrenscentre.ca](mailto:fschmidt@childrenscentre.ca))
- If you have any concerns regarding your rights as a research participant, or wish to speak to someone other than a research team member about this research project, you are welcome to contact the:

Office of Research Ethics, Lakehead University  
1294 Balmoral Street  
Thunder Bay, Ontario P7B 5E1  
Phone: (807) 343-8283

*Please complete ...*

\_\_\_\_\_  
**Parent/Caregiver's Name** (please print)

\_\_\_\_\_  
**Youth's Name** (please print)

\_\_\_\_\_  
**Signature of Parent/Caregiver**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Youth's Primary Caseworker**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Witness**

\_\_\_\_\_  
**Date**

*Appendix H. Youth Assent Form [Lakehead University letterhead]*

Dear Student,

Dilico Anishinabek Family Care and the Children's Aid Society of Thunder Bay are developing a new small-group tutoring program for children in foster care. We are evaluating this program and would like you to take part in this research study. This means you will complete some testing at the beginning, end, and 8 months after you complete the 30-week tutoring program. Some students will start the tutoring in September, 2010, and other students will have to wait until April, 2011, or later before they can begin.

I agree to participate in the Tutoring Toward Success study and understand that it will involve the following:

- I will complete testing at three different times. I will answer questions that ask about my reading and math skills and how I feel about school.
- My foster parent will fill out questionnaires about my behaviour at the beginning and the end of the study.
- My teacher will fill out questionnaires about how well I am doing in school at three different times.
- Participation in this research is voluntary and I can stop at any time.
- All of the information collected for this study will be kept in a secure place at Lakehead University for five years. After the 5 years, this information will then be destroyed.
- If I have any questions or concerns, I can contact Julie Harper at [jharper@lakeheadu.ca](mailto:jharper@lakeheadu.ca) or Dr. Fred Schmidt at 343-5016 or [fschmidt@childrencentre.ca](mailto:fschmidt@childrencentre.ca).

**Student Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Witness Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_