UNDERSTANDING THE SELF-EFFICACY FOR LEARNING BELIEFS OF ADOLESCENTS WITH ADHD

by

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This study examined the self-efficacy for learning beliefs of male and female youth with ADHD, and explored whether symptoms of inattention predict self-efficacy beliefs beyond internalizing symptoms and academic achievement. Thirty-one youth with ADHD (18 males, 13 females) and 31 youth without ADHD (17 males, 14 females) between the ages of 13 and 18 completed self-report questionnaires examining self-efficacy for learning, ADHD symptomatology, academic achievement, and internalizing problems. Results indicated that female youth with ADHD felt less confident in their ability to regulate their learning effectively. In addition, regression analyses with the full sample revealed that inattention predicted self-efficacy for learning beliefs beyond internalizing difficulties and academic achievement. These results suggest that youth reporting high levels of inattention may also have lower perceptions of their ability to accomplish many academic tasks that require self-regulation.
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1 Introduction

In his *Social Foundations of Thought and Action: A Social Cognitive Theory* (1986), Bandura put forth the notion that self-regulatory processes play a central role in human thought and behaviour. He also noted that “among the mechanisms of personal agency, none is more central or pervasive than people’s beliefs about their capabilities to exercise control over events that affect their lives” (Bandura, 1989, p. 1175). Bandura was referring to self-efficacy beliefs, which he defined as subjective judgments of one’s ability to organize and execute courses of action to attain designated goals (Bandura, 1986; 1993). Since Bandura introduced his social cognitive theory, researchers have demonstrated that a strong sense of self-efficacy can enhance performance in a variety of domains, including sports, business, health, and education (see Pajares & Urdan, 2006, for a discussion).

The role of self-efficacy in learning has been studied extensively among typically developing youth (Pajares & Urdan, 2006); however, we know very little about this motivational belief in youth with attention deficit/hyperactivity disorder (ADHD). ADHD is a chronic and debilitating condition that is characterized by developmentally inappropriate inattentive and/or hyperactive/impulsive symptoms (American Psychiatric Association, 2000). Although the disorder is typically diagnosed in childhood, it is estimated that 50 to 80% of cases persist into adolescence (Biederman, Petty, Evans, Smally, & Farone, 2010; Resnick, 2005). Moreover, researchers have found that even after ADHD symptoms have improved over time, a substantial number of youth who are diagnosed with ADHD as children continue to exhibit impairments in the social, emotional, and behavioural domains (Biederman, Mick, & Farone, 2000; Hinshaw, Owens, Sami, & Fargeon, 2006; Lee, Lahey, Owens, & Hinshaw, 2008; Mick, Faraone, Biederman, & Spencer, 2004). Motivational deficits have been frequently observed in this population, as students with ADHD have been found to display less effort and persistence (Milich, 1994), a maladaptive response to failure (Barkley, 1997), abnormally high reward thresholds (Brim & Whitaker, 2000), a performance goal orientation (Dunn & Shapiro, 1999), and a greater preference for easy work compared to their normally developing peers (Carlson, Both, Shin, & Canu, 2002). Furthermore, Volpe and colleagues (2006) found that low motivation in elementary students with ADHD was associated with poor study skills, which in turn, influenced achievement in reading and mathematics. These
findings suggest that motivational deficits in ADHD may play an important role in the academic outcomes of these students. Therefore, to further our understanding of motivation in ADHD, this study examined the self-efficacy beliefs of male and female youth with ADHD. We focused on a particularly important form of self-efficacy in the academic domain: self-efficacy for self-regulated learning (or self-efficacy for learning, for brevity sake). In addition, we sought to uncover those factors that predict self-efficacy for learning in youth with ADHD.

1.1 Self-Efficacy for Learning

The construct of self-efficacy has a variety of characteristics that distinguish it from other self-perceptions, such as self-concept and self-esteem. For example, unlike self-concept, which involves a judgment of perceived competence (Eccles, Wigfield, & Schiefele, 1998), self-efficacy involves perceptions of perceived confidence in successfully performing a given task at a certain level (Bandura, 1989; 1993). That is, self-efficacy judgments are beliefs about what a person can do versus a personal judgment about one’s physical or personal attributes (Bandura, 1989; 1993). In addition, items that measure self-efficacy beliefs tend to direct respondents toward future behavior (e.g., “How confident are you that you can…?” or “How well can you…?”), whereas self-concept items are more past-oriented in that they direct respondents toward previous accomplishments (e.g., “I am good…” or “I have done well…” (see Bong & Skaalvik, 2003, for a review). Moreover, self-concept is a domain-specific evaluation, whereas self-efficacy judgments are both domain and situation specific. Thus, students may feel that they are good at math (self-concept), but they may simultaneously judge their confidence in solving quadratic equations as low (self-efficacy) (Bandura, 1989; Zimmerman, 2000).

Self-efficacy for learning refers to the beliefs that students hold about their ability to use self-regulated learning strategies to cope with difficult learning conditions (Bandura, 2006). Self-regulated learners are able to effectively use self-regulated learning strategies, such as organizing information, planning, reflecting on one’s performance, and rehearsing or using memory aids, in a manner that is directed at successfully acquiring information or academic skills (Zimmerman, 2002; Zimmerman & Martinez-Pons, 1992). Consistent with the
premises of Bandura’s social cognitive theory, how confident students feel in using self-regulatory strategies can determine how well they are able to manage their learning environment and self-regulate their learning effectively (Bandura, 1993; Pajares & Urdan, 2006; Zimmerman, 2000).

Self-efficacy for learning has received considerable attention from researchers over the years. Studies have revealed this motivational belief is a key predictor of a variety of academic outcomes, including grades, classroom engagement, academic achievement, the likelihood of staying in school, expectations for academic success, and students’ actual use of self-regulatory strategies (e.g., Caprara et al., 2008; Kitsantas & Zimmerman, 2009; Schunk, 1985; Zimmerman, Bandura, & Martinez-Pons, 1992; Zimmerman & Kitsantas, 2005; 2007). In addition, self-efficacy for learning beliefs have been found to correlate positively with academic self-efficacy and self-concept, mastery goal orientation, value judgments towards school, perceptions of responsibility for one’s academic outcomes, and the quality of homework completion (e.g., Bandura, 1993; Lent, Brown, & Larkin, 1987; Linnenbrink & Pintrich, 2002; Pajares, 1996; Pajares & Graham, 1999; Pintrich & De Groot, 1990; Usher & Pajares, 2008; Zimmerman & Bandura, 1994; Zimmerman & Kitsantas, 2007; Zimmerman & Martinez-Pons, 1990). It has been found to correlate negatively with anxiety, procrastination, and performance goal orientation (Tan et al., 2008). What is particularly interesting in the self-efficacy literature is the finding that these beliefs contribute to academic outcomes above and beyond one’s knowledge, skills, intellectual ability, and previous performance accomplishments (Bouffard-Bouchard, 1990; Pajares & Urdan, 2006). It is clear from the above studies on academic self-efficacy and self-efficacy for learning that success in the classroom is not simply based on how capable students are, but also how capable they truly believe they are. Thus, it is important to learn about the self-efficacy beliefs of youth with ADHD, as these motivational beliefs may contribute to the academic outcomes of these students.

Gender differences in self-efficacy for learning have been demonstrated, with girls exhibiting higher self-efficacy for learning beliefs than boys (e.g., Pajares & Valiante, 2001; Vecchio, Gerbino, Pastorelli, Del Bove, & Caprara, 2007). For example, Zimmerman and Martinez-Pons (1990) examined gender differences in self-efficacy and strategy use in a sample of 90
boys and girls in grades 5, 8, and 11. Researchers found that girls exhibited more goal-setting, planning, self-monitoring, and record-keeping behaviours compared to boys. In other words, girls were better at structuring their environment in a manner that optimized their learning and they also felt more confident in their ability to do so.

### 1.2 Self-Efficacy for Learning in Adolescence

A strong sense of self-efficacy for learning is especially important during the adolescent years as young people are not only faced with a major shift in the difficulty of academic work (Wigfield, Eccles, & Pintrich, 1996), but they must also become more independent and assume responsibility for their own learning (Zimmerman & Cleary, 2006). Youth are expected to handle multiple courses and assignments, complete work at home, meet deadlines, and seek help on their own. They are also required to develop and apply a number of general learning skills such as note-taking, reading, essay-writing, studying, and test-taking (Zimmerman, Bonner, & Kovach, 1996). In addition to these diverse academic challenges, youth must simultaneously focus on maintaining peer relationships, deal with a number of physical changes, and prepare for adult life. Self-efficacy theorists have suggested that the beliefs that young people hold about their capabilities are powerful determinants of how well they are able to self-regulate their learning effectively amidst the diverse challenges associated with this developmental period (Bandura, 2006; Zimmerman, 2000; Zimmerman & Cleary, 2006). Simply stated, if youth do not feel capable of exercising the necessary self-regulatory skills and strategies when they are faced with an obstacle towards learning, then they are unlikely to do so (Pajares & Urdan, 2006).

Given the many challenges that are associated with the transition from childhood to adolescence, it is not surprising that youth often experience a decrease in their self-confidence, self-esteem, and motivation during this time (e.g., Anderman & Maehr, 1994; Eccles & Midgley, 1989; Pajares & Valiante, 2002; Vecchio et al., 2007). In addition, with adolescence comes an increasing awareness of the opinions and relative abilities of others (Richman, Hope, & Mihalas, 2010). Consequently, by adolescence, students may hold more realistic self-appraisals of their academic skills (Harter, 1999; Stipek, 1998). Indeed, Pajares and Valiante (2002) found that students felt less confident in their ability to self-regulate
their learning as they progressed from elementary school to high school. These findings were corroborated in a recent longitudinal study by Caprara and colleagues (2008), who also demonstrated that youth experience a progressive decline in their self-efficacy for learning from junior to senior high school. In addition, Caprara et al. found that, after controlling for socioeconomic status, those students who experienced less of a drop in their self-efficacy for learning were more likely to achieve higher grades and less likely to drop out of high school. While it has been shown that both girls’ and boys’ self-efficacy for learning beliefs decrease over time (e.g., Caprara et al., 2008), girls show less of a decline than boys (Vecchio et al., 2007). Overall, the above findings suggest that adolescence is a period during which students feel less confident in their self-regulatory abilities. Unfortunately, this lack of confidence occurs during a time when academic achievement is considered crucial to the future academic and vocational opportunities that become available to youth. Helping young people develop an optimistic sense of personal efficacy can therefore play a key role in their ultimate academic and career success (Bandura, 2006; Pajares & Urdan, 2006). This may be particularly true for youth with ADHD, who are at a greater risk for poor academic and vocational outcomes compared to typically developing youth (e.g., Barkley, Fischer, Smallish, Fletcher, 2006; Frazier, Youngstrom, Glutting, & Watkins, 2007; Hinshaw, Carte, Fan, Jassy, & Owens, 2007; Lee et al., 2008; Mannuzza & Klein, 2000).

1.3 ADHD in Adolescence

Similar to their peers, adolescents with ADHD must face the numerous challenges of high school, but with the added impairments that accompany ADHD (Barkley, 1997; Pennington & Ozonoff, 1996). There is strong empirical support that ADHD in childhood is associated with poor outcomes in adolescence, including negative peer relations, high rates of comorbid and psychiatric difficulties, as well as neuropsychological and executive function deficits (Hinshaw et al., 2007; Lee et al., 2008; Mannuzza & Klein, 2000). Poor academic outcomes are well-documented in ADHD and studies in youth have found that these students are more likely to have lower grades, lower scores on standardized achievement measures, and are less likely to complete high school and pursue post-secondary education (Barkley et al., 2006; Frazier et al., 2007). Even in community samples of children, students with attention problems are more likely to drop out of high school than students without attention problems,
suggesting that inattention may be a unique risk factor for high school dropout (Pagani et al., 2008). Many students with ADHD struggle with academic underachievement and some studies have found that up to 70% of students with ADHD have a comorbid learning disability (LD; e.g., Mayes, Calhoun, & Crowell, 2000). Of those youth with ADHD who enter post-secondary education, many continue to demonstrate academic underachievement, low motivation, and poor self-regulation well into college, university, and beyond (e.g., Gropper & Tannock, 2009; Frazier et al., 2007; Owens, Hinshaw, Lee, & Lahey, 2009; Reaser, Prevatt, Petscher, & Proctor, 2007). In college, students with ADHD have demonstrated greater impairments than their non-ADHD peers in the areas of test-taking, summarizing, outlining, studying, and note-taking (Reaser et al., 2007; Zwart & Kallemeyn, 2001). These academic skills and strategies are necessary for success at the secondary and post-secondary level where students are responsible for managing their own learning and acquiring academic skills independently of teacher assistance.

ADHD symptoms tend to manifest themselves differently once children enter adolescence. Mick et al. (2004) noted in their recent review that symptoms of hyperactivity-impulsivity tend to subside in adolescence, whereas symptoms of inattention remain constant. Moreover, executive functioning deficits are thought to become particularly salient during the adolescent years, as youth are faced with increased autonomy and are required to juggle the many demands of school, home, and work life (Toplack, Bucciarelli, Jain, & Tannock, 2009; Wasserstein, 2005). Indeed, several researchers have demonstrated that male and female youth with ADHD show worse performance than youth without ADHD on measures of executive functioning, including response inhibition, delay of gratification, planning, self-control, dividing and focusing attention, and set-shifting (Martel, Nikolas, & Nigg, 2007; Toplack et al., 2009; Wasserstein, 2005). Compared to their non-ADHD peers, youth with ADHD also score significantly lower on parent and teacher behavioural ratings of executive functioning (Toplack et al., 2009). Day-to-day consequences of these executive functioning difficulties in individuals with ADHD include forgetfulness, disorganization, difficulty initiating tasks, and poor time management, among others (e.g., Resnick, 2005). Furthermore, researchers have found that executive function deficits in ADHD may be more closely related to inattentive symptoms than hyperactive-impulsive symptoms (e.g., Stavro, Ettenhofer, & Nigg, 2007). Given the salience of inattention and executive functioning
difficulties in adolescents with ADHD, it is of no surprise that these studies struggle with using self-regulatory strategies such as self-monitoring, goal setting, and planning to manage their learning environment. If youth with ADHD struggle with self-regulation, it is reasonable to assume that they may express lower self-efficacy for learning beliefs than their non-ADHD peers. However, very few studies to date have examined the self-efficacy beliefs of youth with ADHD. More is known about self-efficacy beliefs in community samples of youth with symptoms of ADHD as well as more general self-perceptions such as self-concept and self-esteem in children and youth with the disorder.

1.4 Self-Perceptions in ADHD

There is some limited research in community samples of adolescents and college students with symptoms of ADHD that suggests that youth with ADHD may hold lower self-efficacy perceptions than their non-ADHD peers. For example, Young and colleagues (2005) followed a community sample of girls showing pervasive hyperactivity and conduct problems across an 8-year span beginning from age 7. It is important to note, however, that the measure of hyperactivity used in Young et al.’s study also included items that measured symptoms of inattention, such as distractibility and sustaining attention. Nonetheless, researchers found that hyperactivity was a risk factor for low academic self-efficacy at age 15, not conduct problems. In addition, girls who were more hyperactive as children were also less likely to plan for their future academic or career paths. In college students, researchers have found that students with higher levels of self-reported ADHD symptoms, including both inattention and hyperactivity, also felt less confident in their ability to effectively make decisions about, and plan for, their careers and education. Students with higher level of ADHD symptoms also had lower grades, poorer social and academic functioning, and lower levels of study habits and skills (Norwalk, Norvilitis, & MacLean, 2009). These results were replicated in a sample of college students from China (Norvilitis, Sun, & Zhang, 2010).

In general, researchers know very little about the self-perceptions of youth with ADHD. In children with ADHD, however, self-concept and self-esteem have been studied extensively (see Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007, for a review). Results from these studies suggest that, regardless of their functional difficulties across numerous domains,
children with ADHD will underreport the presence of these problems and actually overestimate their own competence to a greater degree than their typically developing peers. In studies that have examined absolute self-evaluations, children with ADHD report self-appraisals of competence and global self-worth that are comparable to typically developing children (Hoza Pelham, Milich, & Pillow, 1993). This overestimation of competence has been termed the **positive illusory bias (PIB)** and it has been observed in other clinical populations including children with learning disabilities (e.g., Heath & Glen, 2005; Stone & May, 2002). Whether students with ADHD continue to exhibit overly optimistic self-perceptions once they enter adolescence remains a question for future research; however, existing literature suggests that youth with ADHD hold lower absolute perceptions of competence than their peers without ADHD (e.g., Anderson, Williams, McGee, & Silva, 1989; Edbom, Granlund, Lichtenstien, & Larsson, 2008; Hinshaw et al., 2006; Young, Heptinstall, Sonuga-Barke, Chadwick, & Taylor, 2005). For example, Rucklidge and Tannock (2001) found that females with ADHD (predominately inattentive and combined type) who were between the ages of 13 and 16 displayed levels of self-esteem that were significantly lower than females without ADHD. Similarly, Slomkowski, Klein, and Mannuzza (1995) found that after controlling for the presence of a current mental disorder, adolescents and young adults aged 16 to 23 who had ADHD symptoms in childhood displayed lower self-esteem than adolescents who did not have ADHD symptoms in childhood. Moreover, researchers found that in the hyperactive and control groups, youth with higher self-esteem rated themselves as having fewer ADHD symptoms and were judged by clinicians to have better psychosocial functioning. In terms of gender differences, female youth with ADHD have been found to exhibit lower self-esteem compared to male youth with ADHD, in addition to other psychosocial difficulties such as higher levels of anxiety and depression, increased feeling of distress, and poorer coping skills (Rucklidge & Tannock, 2001; Rucklidge, 2010; Young et al., 2005). Although self-esteem and self-concept are conceptually different from self-efficacy, the above findings from studies in adolescents, college students, and young adults suggest that youth with ADHD may have more negative views of themselves and their abilities compared to their non-ADHD peers.

An examination of the LD literature also provides hints towards the self-efficacy for learning beliefs of youth with ADHD, as both ADHD and LD are associated with deficits in academic
functioning, motivation, self-regulation, and executive functions (e.g., Baird, Scott, Dearing, & Hamill, 2009; Harris, Reid, & Graham, 2004). Studies in youth with LD have found that lower self-efficacy for learning beliefs are common in this population (e.g., Baird et al., 2009; Harris et al., 2004; Hampton & Mason, 2003; Klassen, 2007; 2010). For instance, Klassen (2008) conducted three studies investigating the motivational beliefs of students with LD. Participants in the first two studies were in high school, whereas participants in the third study were undergraduate students. Klassen found that all students with LD, regardless of their age, expressed low confidence in their ability to self-regulate their learning compared to students without LD. In a more recent study, Klassen (2010) examined gender differences in self-efficacy for learning among youth with and without LD and discovered that adolescent girls showed higher levels of confidence to regulate their learning, regardless of LD status. These results are consistent with gender differences found in the typically developing literature (e.g., Zimmerman & Martinez-Pons, 1990).

Thus, findings from research in youth with LD combined with results from emerging studies examining self-efficacy in community samples of students with symptoms of ADHD provide strong support for the contention that youth with ADHD may experience less optimistic beliefs about their ability to self-regulate their learning effectively, regardless of their actual achievement levels. The current study will test this hypothesis, along with exploring whether there are gender differences in self-efficacy.

1.5 Predictors of Self-Efficacy

Current research indicates that several factors are associated with youth’s self-efficacy for learning beliefs (e.g., Caprara et al., 2008; Kitsantas & Zimmerman, 2009; Schunk, 1985; Tan et al., 2008; Zimmerman, Bandura, & Martinez-Pons, 1992; Zimmerman & Kitsantas, 2005; 2007). The present study will focus on the role of academic achievement and internalizing difficulties as predictors of self-efficacy for learning because both are implicated in ADHD and have been known to influence the self-perceptions of these students (see Owens et al., 2007, for a review). In addition, there is recent evidence to suggest that higher levels of ADHD symptoms may be associated with lower self-efficacy beliefs regarding one’s future vocational choices (Norwalk et al., 2009). Therefore, in addition to
academic achievement and internalizing difficulties, this study will also examine the contribution of inattention symptoms to the self-efficacy for learning beliefs of youth with and without ADHD.

1.5.1 Academic achievement.

Most researchers have reported that higher self-efficacy beliefs are associated with better grades and higher scores on measures of academic achievement (e.g., Zimmerman & Bandura, 1994; Zimmerman & Martinez-Pons, 1990; 1992). Due to the correlational nature of these studies, however, it is plausible that the relationship may also exist in the opposite direction: that is, higher academic abilities may lead to more optimistic self-efficacy beliefs. Few researchers, however, have sought to examine this association. This is surprising given that, in his social cognitive theory, Albert Bandura (1986) posits that previous academic successes are one of the most powerful sources of academic self-efficacy beliefs. Specifically, Bandura noted that once students have completed an academic task, they will naturally interpret their performance and incorporate their judgments into their self-perceptions. Furthermore, Bandura (1989) put forth the notion of reciprocal determinism to describe the reciprocal interactions among personal, environmental, and behavioural factors. More specifically, the way in which people interpret the results of their actions informs and alters their environment and personal beliefs, which in turn, inform and alter future actions. From this perspective, the relationship between previous academic performance and self-efficacy beliefs can be described as reciprocal such that previous successes can enhance self-efficacy beliefs, and higher self-efficacy beliefs can enhance future academic performance.

Based on Bandura’s view that past academic performance can inform self-efficacy perceptions, students with poorer academic abilities may have lower self-efficacy for learning beliefs because they do not have the necessary academic skills (e.g., reading, writing, math) to successfully complete many common academic tasks, such as note-taking, essay-writing, and reading comprehension, and they are also more likely to experience repeated academic failure. Indeed, studies in students with LD have demonstrated that these students report fewer experiences of academic success compared to their typically developing peers, and this in turn is related to their lower self-efficacy for learning beliefs.
For example, Hampton and Mason (2003) examined the role of learning disability status and various sources of self-efficacy, including previous academic accomplishments and internalizing difficulties, in the self-efficacy beliefs of youth with LD. Structural equation modeling revealed that LD status had indirect effects on self-efficacy through the various sources (e.g., previous academic successes, encouragement from others, internalizing difficulties), and the various sources of self-efficacy had a direct effect on self-efficacy beliefs.

Like students with LD, lower academic achievement in ADHD may lead to lower self-efficacy for learning beliefs because these students do not have many of the academic skills necessary to successfully manage their learning environment. In addition, due to their academic difficulties, youth with ADHD may be more commonly faced with repeated academic failure. Bandura theorized that repeated failures lower self-efficacy beliefs; therefore, over time, youth with ADHD may begin to internalize their failure experiences and this may weaken their beliefs about their abilities and lower their expectations for future success. Lowered perceptions of confidence may alter their willingness to attempt similar tasks in the future and may also result in less effort and persistence in the face of difficulty. Therefore, given the widespread academic impairments in youth with ADHD, it is important to consider academic abilities as a predictor of self-efficacy for learning in youth with ADHD, as academic skills may play an important role in the development of an adequate sense of confidence in self-regulating one’s learning environment.

### 1.5.2 Internalizing difficulties.

Many researchers have explored the association between emotional functioning and self-efficacy perceptions and have demonstrated that these two constructs relate in diverse areas of functioning, including education (e.g., Nelson & Knight, 2010), sports (e.g., Nicholls, Polman, & Levy, 2010), interpersonal relations (Thomasson & Psouni, 2010), as well as stress and illness (e.g., Roddenberry & Renk, 2010). In general, results from these studies suggest that higher levels of internalizing symptoms such as anxiety and depression are related to lower levels of perceived self-efficacy. According to Bandura (1986; 1993), students evaluate their physiological and emotional states as they judge their sense of
confidence; strong emotional reactions can send signals to students about expected success or failure. Thus, feeling upset, anxious, or hopeless when faced with a particular task may lead students to believe that they are not capable of performing that task. In contrast, a secure sense of physical and emotional well-being and reduced negative emotional states can strengthen feelings of confidence (Bandura, 1986; 1993). Bandura examined his theory and discovered that academic self-efficacy beliefs contribute to depression directly as well as though their influence on academic achievement. Bandura and colleagues (1999) found that students with lower self-efficacy beliefs were also likely to obtain lower achievement scores, which in turn, led to feeling of academic inadequacy and depression (Bandura, Pastorelli, Barbaranelli, & Caprara, 1999). Similarly, McGee, Anderson, Williams, and Silva (1986) found that depression was associated with lower levels of self-esteem and a negative view of one’s academic ability in a group of 792 school-age children. These researchers concluded that depression in may be more closely related to lower perceptions of competence than with actual task performance per se.

Emotional disturbances such as depression, anxiety, and low self-esteem are common in youth with ADHD (see Barkley, 1998, for a discussion). For example, in a recent longitudinal study by Lee and colleagues (2008), researchers discovered that 37% of youth who were diagnosed with ADHD in preschool experienced internalizing difficulties in adolescence, compared to 10% of youth in the comparison group. In addition, some researchers have linked higher levels of internalizing symptoms in ADHD with lower levels of self-esteem. Treuting and Hinshaw (2001) examined depression and self-esteem in a large sample of boys with ADHD aged 7 to 12 years. These researchers found that children with ADHD exhibited higher levels of depression and lower levels of self-esteem compared to their typically functioning peers. In addition, researchers discovered that depression and self-esteem were negatively related in both the ADHD and control groups. Furthermore, symptoms of inattention and hyperactivity have been linked with depression in community samples of children and youth (e.g., Herman, Lambert, Ialongo, & Ostrander, 2007). For example, MacPhee and Andrews (2006) explored those factors that lead to depression in a large community sample of pre-adolescent children. Although these researchers found that low self-esteem was the strongest predictor of later depression, symptoms of hyperactivity/inattention also significantly contributed the development of depressive
symptoms in early adolescence. Taken together, the above research suggests that students with elevated levels of inattention and hyperactivity are more likely to experience symptoms of depression, and symptoms of depression have, in turn, been linked with lower levels of perceived competence and self-esteem.

1.5.3 ADHD symptoms.

To the best of our knowledge, there have been no published studies examining the concurrent contributions of achievement and internalizing difficulties to self-efficacy for learning beliefs of individuals with ADHD. However, research by Norwalk et al. (2009) has highlighted the importance of considering symptoms of inattention in the self-efficacy perceptions of youth with ADHD. Specifically, these researchers were interested in determining the relationship between ADHD symptoms and factors associated with academic and social adjustment in college, including career decision-making self-efficacy, study skills, and GPA. A total of 321 male and female undergraduate students completed self-report questionnaires assessing ADHD symptoms and various areas of college adjustment. Norwalk and colleagues found that higher symptoms of hyperactivity and inattention were related to lower career-decision-making self-efficacy, academic adjustment, study skills, and grades in both male and female college students. Results of the regression equation predicting career decision-making self-efficacy revealed that, even after controlling for depression and gender, inattention emerged as a significant predictor of career decision-making self-efficacy, whereas hyperactivity did not. Findings from Norwalk and colleagues’ study adds to the growing body of literature suggesting that symptoms of inattention are more strongly associated with academic functioning than symptoms of hyperactivity. Students with the primarily inattentive and combined subtypes of ADHD have been found to score lower on cognitive and achievement tests, have worse grades, more frequent placement in special education, slower processing speed, and greater deficits in executive functions compared to those with primarily hyperactive symptoms (e.g., Todd et al., 2002). Norwalk and colleagues reasoned that the greater cognitive and executive functioning deficits found in inattentive students may make it difficult for them to plan ahead for their future, self-reflect, divide their attention, and demonstrate the self-control necessary to make decisions about their future career goals. In addition, poorer academic adjustment found in students with primarily inattentive symptoms
may also make these students feel less confident in their ability to achieve their educational and vocational goals (Norwalk et al., 2009). This research has highlighted the importance of inattention symptoms to self-efficacy beliefs. Although Norwalk et al.’s (2009) study focused on career decision-making self-efficacy, their approach can be applied to understanding the self-efficacy for learning beliefs of youth, as these two forms of self-efficacy rely on similar strategies and skills associated with self-regulation (i.e., planning, goal setting, self-reflecting, etc.).

1.6 Objectives and Hypotheses

According to social cognitive theory, the beliefs that youth with ADHD hold about their capabilities may play a critical role in determining their success at school, even beyond their actual knowledge and skills (Bandura, 1993; Pajares, 1996; Pajares & Urdan, 2006). Given that students with ADHD experience academic underachievement that extends past the childhood years (e.g., Brassett-Harknett & Butler, 2007; Reaser et al., 2007; Rucklidge & Tannock, 2001), understanding their motivational beliefs in adolescence is an important research goal. Moreover, the study of self-efficacy and self-regulation is critical in adolescence because of the shift toward more self-directed learning during this period of development. As adolescents achieve greater independence, they must assume a greater responsibility for their learning and develop diverse self-regulatory skills to cope with the increasing demands of school. A strong sense of self-efficacy supports students’ ability to sustain their efforts to learn and regulate their behaviour effectively (Pajares & Urdan, 2006; Zimmerman & Cleary, 2006). Given that youth with ADHD experience cognitive and academic impairments that may interfere with their ability to effectively navigate their learning environment, it is important to gain an understanding of their self-efficacy beliefs in order to inform interventions designed to enhance the academic functioning of these students. However, very few researchers have examined self-efficacy for learning in youth with ADHD. Furthermore, in typically developing students, gender differences in self-efficacy for learning frequently favour female students (e.g., Pajares & Valiante, 2002); whether a similar gender difference exists in a population of youth with ADHD has yet to be explored. Therefore, the first purpose of the present study was to explore the self-efficacy for learning beliefs of adolescents with ADHD and examine whether self-efficacy beliefs differ
as a function of gender. In addition, although previous academic successes and emotional functioning are important determinants of self-efficacy beliefs (e.g., Bandura, 2000; Bandura et al. 1999); researchers have yet to explore whether this relationship holds true in youth with ADHD. Studies examining career decision-making self-efficacy in college students with ADHD also highlight the importance of considering symptoms of inattention when predicting psychosocial outcomes in this population. Thus, the second purpose of this study is to determine whether symptoms of inattention predict self-efficacy for learning beliefs beyond academic achievement and symptoms of anxiety and depression.

Based on previous literature examining self-efficacy in community samples of youth with symptoms of ADHD (e.g., Young et al., 2005), as well as self-efficacy research in youth with LD (Klassen, 2002; 2004; 2007; 2010) we hypothesized that youth with ADHD would display lower self-efficacy for self-regulated learning compared to their non-ADHD peers. Two alternate hypotheses were developed regarding gender differences in self-efficacy for learning. The first hypothesis is based on prior research documenting that female youth with and without LD show more optimistic judgments about their self-regulatory skills than male youth with and without LD (Klassen, 2010). This data supports the hypothesis that females with and without ADHD would have higher self-efficacy for learning beliefs than males with and without ADHD. Alternatively, data from studies demonstrating that female youth with ADHD have lower levels of self-esteem (e.g., Rucklidge, 2010; Rucklidge & Tannock, 2001; Slomkowski, Klein, & Mannuzza, 1995) would suggest that female youth with ADHD may feel less confident in their ability to cope with difficulty learning conditions compared to male youth with ADHD. In terms of those factors that predict self-efficacy beliefs, because higher ADHD symptoms have been shown to relate to lower career decision-making self-efficacy (Norwalk et al., 2009; Norvilitis et al., 2010), we predicted that youth with higher levels of inattention will have lower levels of self-efficacy for learning. Based on findings from Norwalk and colleagues’ (2009) study, we expected that, after controlling for achievement levels and symptoms of anxiety and depression, inattention would be a unique predictor of self-efficacy for learning.

2 Method
2.1 Participants

Participants included 62 13- to 18-year-old youth; 31 (18 males, 13 females) were classified as having ADHD, and 31 (17 males, and 14 females) were a typically functioning comparison group. To be included in the study, adolescents in the ADHD sample were required to have: (a) a full-scale IQ ≥80 on the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999), (b) a previous Diagnostic & Statistical Manual for Mental Disorders, Fourth Edition (DSM-IV)-based diagnosis of ADHD from a physician or psychologist, but no diagnosis of a neurological disorder or genetic syndrome (e.g., Pervasive Developmental Disorders, Psychotic Disorders, or Tourette’s Disorder), and (c) clinically significant scores (T-score ≥70) on at least one of the core ADHD indices (i.e., DSM-IV Hyperactive Impulsive, DSM-IV Inattentive, and DSM-IV Global) of the Conners' 3 Parent Rating Scale, Long Form (Conners 3-P; Conners, 2008) or the Conners' 3 Teacher Rating Scale, Long Form (Conners 3-T; Conners, 2008) and a score in the clinical or borderline range (T-score ≥ 60) by the second informant. Analogous inclusion criteria were used for the youth in the comparison sample: (a) a full-scale IQ of 80 or above on the WASI, (b) no previous diagnosis of ADHD or any learning or behaviour problems identified by their parent, and (c) scores in the normal range of functioning (T-scores ≤ 65) on the DSM-IV scales of the Conners 3-P and Conners 3-T.

Adolescents with and without ADHD were recruited through postings in the community, including local agencies and clinics, community centers, libraries, and local newspapers. Although some families did speak additional languages in the home, participating youth in the study were proficient in reading, speaking, and writing in English. Of the youth with ADHD, 20 (65%) were taking psychostimulant medication for their symptoms (e.g., Ritalin, Concerta); however, on the testing date, participants were asked to be medication-free. As is typical with an ADHD sample, 15 (48%) had one previously diagnosed comorbid diagnosis, 5 (16%) had two comorbid diagnoses, and 1 (3%) had three comorbid diagnoses based on parent report. Of these comorbid diagnoses, 18 (58%) were Learning Disabilities, 6 (19%) were Anxiety Disorders, 3 (10%) were Oppositional Defiant Disorder, and 2 (6%) were Depression. Sixteen (52%) of the youth in the ADHD sample were considered low achievers and 26 (83%) were receiving some form of special education services at the time of the
study, including withdrawal support \((n = 10)\), a modified curriculum \((n = 4)\), or support from an educational assistant \((n = 5)\). None of the youth in the comparison group had been diagnosed with a learning or behaviour disorder, nor were they receiving special education services. A greater number of adolescents with ADHD demonstrated impairments in the academic and social domains than their non-ADHD peers. For example, 68% of youth with ADHD obtained a score in the clinical or borderline range \((T\)-score \(\geq 60)\) on teacher-reported learning problems \((\text{Conners 3-T Learning Problems})\) compared to 16% of adolescents in the control group. Similarly, 55% of youth with ADHD scored in the clinical or borderline range on teacher-reported peer relations \((\text{Conner 3-T Peer Relations})\) relative to 23% of comparison youth.

### 2.2 Measures

#### 2.2.1 Demographic information.

Demographic and background information was obtained via a brief questionnaire given to the participant’s mother or father. The information collected included mother’s and father’s highest level of education, marital status, language(s) spoken at home, comorbid disorders, and medication status. The highest level of education obtained by each parent was averaged as a broad indicator of socioeconomic status \((\text{SES})\). Parental education was chosen to represent social class because it has been identified in previous literature as one of the most stable components of a family’s social status \((\text{Featherman, Spenner, & Tsunematsu, 1988})\).

#### 2.2.2 Intellectual functioning.

To screen for participation in the study, all youth were given the \textit{Wechsler Abbreviated Scale of Intelligence} \((\text{WASI}; \text{Wechsler, 1999})\), a standardized abbreviated measure of cognitive capacity. The WASI consists of four subtests: Block Design, Similarities, Vocabulary, and Matrix Reasoning, and can be administered in a four- or two-subtest form. In the current study, the two-subtest version was used (includes Vocabulary and Matrix Reasoning) to yield a full-scale IQ score. The full-scale IQ is represented as a T-score with a mean of 100 and a standard deviation of 15. The WASI has been found to correlate highly with the \textit{Wechsler Intelligence Scale for Children} \((r = .83 \text{ to } .89)\), a widely used measure of intelligence.
(Wechsler, 1999). There is also evidence for high reliability as well as concurrent and construct validity (Sattler, 2001; Wechsler, 2003).

2.2.3 Academic achievement.

Academic achievement was estimated using selected subtests from the *Woodcock Johnson Test of Achievement—Third Edition* (WJ-III; Mather & Woodcock, 2001). The WJ-III is a widely-used, norm-referenced test of achievement that includes 22 achievement subtests organized into reading, math, written language, and oral language clusters. Each achievement subtest and cluster yields a standard score with a mean of 100 and a standard deviation of 15 (Mather & Woodcock, 2001). In the current study, the reading cluster comprised the Letter-Word Identification and Passage Comprehension subtests; the writing cluster comprised the Spelling and Writing Samples subtests; the math cluster comprised Calculation and Applied Problems. The WJ-III has good evidence for internal consistency with subtest correlations exceeding .80 and .90 for the clusters (Mather & Woodcock, 2001).

2.2.4 Internalizing difficulties.

The *Youth Self-Report* (YSR; Achenbach, 1991; Achenbach & Rescorla, 2001) is a widely used measure that yields standardized estimates of child and adolescent behaviour problems and competencies. The YSR, a 118-item questionnaire, was administered to youth and contains 8 subscales: anxious/depressed, withdrawal/depressed, somatic complaints, social problems, thought problems, attention problems, delinquent behaviour, and aggression. T-scores are derived for each subscale and overall scores are designated as reflecting Externalizing Problems (composed of the delinquent and aggressive behaviour subscales), and Internalizing problems (composed of the withdrawal, somatic complaints, anxiety, and depression subscales). In the current study, the overall T-score representing Internalizing Problems was used in the analyses. Higher T-scores indicate greater impairment. The YSR has evidence for good reliability and validity (Achenbach, 1991; Achenbach & Rescorla, 2001).

2.2.5 ADHD symptoms.
The Conners Rating Scales-Third Edition (Conners 3; Conners, 2008) were used to measure ongoing symptoms of ADHD. The Conners scales have been used widely for the clinical assessment of ADHD in children and youth. In the current study, parents and teachers of youth with and without ADHD completed parallel versions to screen for participation in the study (Conners 3-P and Conners 3-T). Youth were administered the self-report version (Conners 3-SR) as a measure of their own ADHD symptoms.

The Conners 3-SR (Conners 3-P) consists of 99 items that make up 10 subscales, 2 of which were used in the current study: DSM ADHD Inattentive and DSM ADHD Hyperactive-Impulsive. Youth rated their behaviour on a 4-point Likert scale: 0 (not true at all), 1 (just a little true), 2 (pretty much true), and 3 (very much true). For each of the subscales, a T-score is derived with higher T-scores suggesting more problematic functioning. Internal consistency of the Conners is high (coefficient alphas range from .79 to .96 across subscales) (Conners, Sitarenios, Parker, & Epstein, 1998).

2.2.6 Self-efficacy for learning.

Self-efficacy for self-regulated learning was measured using the Self-Efficacy for Learning Form (SELF) developed by Zimmerman and Kitsantas (2005). The SELF is a 57-item measure that assesses students’ beliefs about their ability to use specific self-regulatory processes to cope with difficult learning conditions that involve reading, note taking, test-taking, writing, and studying. Items on this scale include questions such as “When you don’t understand a paragraph you have just read, can you clarify it by careful rereading?” and “When you feel very anxious before taking a test, can you remember all the material you studied?” Students rate items such as these on a scale that ranges from 0 to 100 in 10-unit increments. Written descriptors are provided alongside the following data points: 0 (definitely cannot do it), 30 (probably cannot do it), 50 (maybe), 70 (probably can), and 100 (definitely can do it). Higher scores on the SELF reflect more positive self-efficacy for learning beliefs.

In the current study, we adapted the SELF from the traditional paper and pencil format to be presented on computer. Each item appeared individually on the computer screen with the 0 to 100 scale (in increments of 10) and the corresponding descriptions. To reduce any
differences based on individual reading levels, items were also read out loud to students through the computer. Once the item was read, students were asked to enter their response using the numbers on the keyboard in a response box that appeared on the screen.

Cronbach alpha reliability for the SELF was .97. Zimmerman and Kitsantas (2005) reported a reliability score of .99. In addition, they reported a correlation between the SELF and teacher ratings of students’ actual self-regulatory behaviour of .72, providing evidence for this measure’s strong predictive validity. Zimmerman and Kitsantas (2005; 2007) also found that scores on the SELF reflect a single underlying self-regulatory factor. Unlike previous measures of self-efficacy for learning (i.e., Bandura, 1989; Schunk, 1996), the predictive validity of the SELF is optimized because the items extend beyond students’ beliefs about their procedural knowledge and skill (e.g., setting goals, monitoring progress) to include their self-perceptions of confidence regarding their ability to cope with particular academic problems and contexts.

2.3 Procedure

The testing sessions were conducted in a laboratory at the Ontario Institute for Studies in Education (OISE) of the University of Toronto. Parents of the adolescents who were interested in participating were given a brief intake screen and asked to complete the Conners 3-Parent over the telephone to determine whether their child met the inclusion criteria. Those families who were eligible to participate were scheduled for an assessment session and were mailed consent forms. When participants arrived at the lab, consent forms were collected and adolescents were given a verbal overview of the procedure by the research assistant. Parents were asked to complete several questionnaires while their child was being tested. In the case when parents did not attend the testing session, the parent measures were sent home with the adolescent for completion and then returned by mail. The Conners 3-Teacher forms were sent to teachers via the parents and/or adolescents and also returned by mail.

Adolescents worked individually with a research assistant for approximately 5 to 6 hours, during which they completed a battery of self-report measures and standardized tests that were included as part of a larger study. Research assistants were graduate students in school and clinical child psychology who were well-trained in psychological test administration. As
an incentive for their participation in the study, all parents and adolescents received an educational and social-emotional report describing their child’s functioning on the standardized assessment measures. In addition to the report, adolescents were given the choice of receiving $30.00 cash or community service hours (necessary to receive a high school diploma in Ontario) to compensate for their time and travel expenses.

3 Results

3.1 Data Analyses

The first objective of this study was to determine whether male and female youth with and without ADHD differ in terms of their self-efficacy for learning beliefs. Prior to addressing this question, univariate analyses of variance (ANOVAs) with group status (ADHD, comparison) and gender as the between-subject factors were conducted to examine whether there were ADHD and/or gender differences on the demographic, behavioural, cognitive, and academic achievement measures. Each of the continuous variables was examined for normality. Except for the Conners 3 parent- and teacher-rated DSM ADHD Inattentive and Hyperactive-Impulsive subscales, all other variables were normally distributed within each subgroup and across the full sample. Attempts to transform the Conners 3 parent- and teacher-rated Inattentive and Hyperactive-Impulsive T-scores were not successful; however, because the $F$-test is considered robust to normality violations (see Lindman, 1974 for a summary), the analyses were conducted using the untransformed variables. Chi-square analyses were used to examine ADHD group differences on the categorical variables (e.g., marital status, parent employment status). Correlations were then conducted to determine which of the examined variables, if any, correlated with self-efficacy for learning beliefs. Those factors that were significantly related were then controlled for in a subsequent two (ADHD, comparison) by two (male, female) ANCOVA using the SELF total score as the dependent variable.

The second objective of this study was to examine whether inattention was a significant predictor of self-efficacy for learning, above and beyond academic achievement and internalizing difficulties. Partial correlations between self-efficacy for learning and self-
reported inattention were first explored, while controlling for internalizing difficulties and achievement in each gender. Partial correlations were conducted in order to determine whether inattention symptoms were associated with self-efficacy for learning independent of achievement and internalizing problems in each group (i.e., ADHD, comparison, female, male). Correlations among the dependent and independent variables within each subgroup and across the total sample were then examined. Next, a hierarchical linear regression was conducted to determine whether adolescents’ self-reported inattention symptoms were a unique predictor of self-efficacy for learning beliefs beyond academic achievement and self-reported internalizing difficulties (Question 2).

3.2 Sample Characteristics

Means and standard deviations for the sample characteristics are presented in Table 1. The results of the ANOVAs revealed that there were no group status or gender differences in age; however, there was a significant group effect for SES, $F(1, 54) = 6.42, p < .05$, partial $\eta^2 = .11$. Specifically, participants with ADHD came from families that were from a lower SES than participants in the comparison group. There were no significant group by gender interaction effects for age or SES. In addition, chi-square analyses indicated that the participants with and without ADHD did not differ significantly from each other on mother, $\chi^2(2) = .71, p = .70$, or father, $\chi^2(2) = .51, p = .77$ employment status (full-time, part-time, or unemployed), parent marital status (single, married, separated, divorced, common-law, or widowed), $\chi^2(4) = 2.70, p = .61$; or languages spoken in the home, $\chi^2(4) = 2.95, p = .57$. These results remained even when the analyses were stratified by gender.

There was an overall effect of group status on estimated Full Scale IQ, $F(1, 58) = 31.54, p < .001$, partial $\eta^2 = .35$, with youth in the ADHD group obtaining lower IQ scores than youth in the comparison group. There were no significant gender or interaction effects for IQ. In terms of academic achievement, there was a significant main effect of group status for WJ-III Brief Achievement, $F(1, 56) = 67.61, p < .001$, partial $\eta^2 = .55$, as well as Brief Reading, $F(1, 56) = 36.85, p < .001$, partial $\eta^2 = .40$, Writing, $F(1, 56) = 45.24, p < .001$, partial $\eta^2 = .45$, and Mathematics, $F(1, 56) = 44.34, p < .001$, partial $\eta^2 = .44$. Specifically, youth with ADHD scored significantly lower than their typically developing peers on overall academic
achievement and achievement in the core academic areas of reading, writing, and math. In addition, there was a significant main effect of gender for overall achievement, $F(1, 56) = 9.90, p < .01$, partial $\eta^2 = .15$, and achievement in mathematics, $F(1, 56) = 13.43, p < .01$, partial $\eta^2 = .19$, with females scoring significantly lower on these scales than males. The group status by gender interaction effect for mathematics achievement was also significant, $F(1, 56) = 7.20, p < .05$, partial $\eta^2 = .11$. Specifically, in the ADHD group, female youth scored significantly lower than male youth in math, $F(1, 56) = 19.48, p < .001$, partial $\eta^2 = .26$; however, in the comparison group, males and females did not differ significantly in terms of their mathematics achievement.

ANOVA were conducted on each the parent-, teacher-, and self-report versions of the Conners 3, with DSM ADHD Inattentive and DSM ADHD Hyperactive-Impulsive subscales as the dependent variables. Significant group differences emerged across all three versions on ratings of inattention (parent: $F(1, 58) = 286.14, p < .001$, partial $\eta^2 = .83$; teacher: $F(1, 50) = 32.59, p < .001$, partial $\eta^2 = .40$; and self: $F(1, 58) = 34.40, p < .001$, partial $\eta^2 = .37$), and hyperactivity/impulsivity (parent: $F(1, 58) = 101.98, p < .001$, partial $\eta^2 = .64$; teacher: $F(1, 50) = 24.93, p < .001$, partial $\eta^2 = .33$; and self: $F(1, 58) = 10.33, p < .01$, partial $\eta^2 = .15$). Thus, parent-, teacher-, and self-reported symptoms of inattention and hyperactivity-impulsivity were significantly higher in the ADHD group than in the comparison group. There were no gender differences in parent-, teacher-, or self-reported symptoms of inattention or hyperactivity-impulsivity and there were no significant interaction effects.

The analysis of the YSR Internalizing Problems subscale indicated that there was a significant main effect of group status ($F(1, 54) = 9.91, p < .01$, partial $\eta^2 = .15$) with participants in the ADHD group reporting more internalizing difficulties than participants in the comparison group. The main effect of gender was not significant nor was there a significant group status by gender interaction.

### 3.3 Group Differences in Self-Efficacy for Learning

Because there were significant group differences in SES as well as significant gender differences in overall academic achievement, the degree to which these variables correlated with self-efficacy for learning beliefs was explored to determine whether they should be
entered as covariates in a subsequent analysis of covariance (ANCOVA). Although there were other group differences that emerged from the preliminary analyses (i.e., IQ; parent-, teacher-, and self-reported inattention and hyperactivity-impulsivity; self-reported internalizing symptoms), these variables were not considered as potential covariates because they reflect qualities that are highly associated with ADHD. One of the assumptions of analysis of covariance (ANCOVA) is that the covariates must be statistically independent from the grouping variable (Miller & Chapman, 2001). Overall achievement was significantly correlated with self-efficacy for learning beliefs ($r = .41, p < .01$); therefore, this variable was entered as a covariate in a subsequent ANCOVA.

A two (ADHD, comparison) by two (female, male) ANCOVA (controlling for overall achievement) was performed to test the hypothesis that male and female youth with ADHD exhibit significantly lower self-efficacy for learning beliefs than male and female youth without ADHD. There was a significant main effect of group status, $F(1,55) = 12.97, p < .01$, partial $\eta^2 = .18$, and a significant group status by gender interaction, $F(1,55) = 13.39, p < .01$, partial $\eta^2 = .20$. Youth with ADHD ($M = 58.10, SD = 15.53$) rated their self-efficacy for learning beliefs significantly lower than comparison youth ($M = 72.15, SD = 9.35$). Specifically, for youth with ADHD, their ratings corresponded to the “maybe-probably can” range on the SELF, whereas for the comparison group, ratings fell closer to the “probably can” value. In other words, youth with ADHD felt less competent in dealing with challenging learning situations related to reading, writing, note-taking, studying, and test-taking compared to youth without ADHD.

To examine the interaction effects, SELF scores were analyzed across the ADHD and comparison groups within each gender (see Figure 1). Specifically, among female youth, those with ADHD reported lower self-efficacy for learning beliefs ($M = 50.11, SD = 14.62$) (around the “maybe” value on the SELF) compared to those without ADHD ($M = 76.42, SD = 8.34$) (around the “probably can” value on the SELF), $F(1,54) = 19.19, p < .001$, partial $\eta^2 = .26$. In other words, female youth with ADHD felt less able to cope with challenging learning situations compared to female youth without ADHD. Among the male youth, however, there were no significant differences between participants with and without ADHD.
in their self-efficacy for learning beliefs ($M = 64.59, SD = 13.38$ and $M = 68.63, SD = 8.85$, respectively).

### 3.4 Predictors of Self-Efficacy for Learning

#### 3.4.1 Correlations.

Partial correlations were first conducted to explore whether inattention symptoms were associated with self-efficacy for learning independent of achievement and internalizing problems in each group. In youth with ADHD, partial correlations revealed that inattention was significantly related to self-efficacy for learning after controlling for achievement and internalizing difficulties ($r = -.64, \ p < .001$). Specifically, higher levels of inattention were related to lower levels of self-efficacy. Similar results were found in the control group, although the relationship was not significant ($r = -.35, \ p = .067$). In female and male youth, inattention was significantly positively related to self-efficacy perceptions after controlling for achievement and internalizing symptoms ($r = -.58, \ p < .001$, $r = -.46, \ p < .05$, respectively).

To test the possibility of combining the youth with and without ADHD into a single sample, separate Pearson correlations matrices were first examined to compare males and females in each of the ADHD and comparison groups (i.e., ADHD male vs. ADHD female; comparison male vs. comparison female). Within each of these subgroups, the difference in $r$ between the outcome variable (i.e., self-efficacy for learning beliefs) and each of the three predictor variables (i.e., standardized achievement scores; self-reported internalizing problems; self-reported inattention) was examined for significance using the Fisher $r$-to-$z$ transformation. This method calculates a value of $z$ from $r$ that can be applied to assess whether two correlation coefficients differ significantly. Because the males and females in each of the ADHD and comparison groups did not differ significantly on any one variable, this was taken as evidence for combining the genders within the groups. Between group comparisons were then made to determine whether youth with and without ADHD could be combined to form a single ADHD/comparison group. There were no significant differences in the correlation coefficients; thus, the groups were combined for the subsequent analyses.
Prior to conducting the regression analyses, Pearson correlations among the predictor and outcomes variables were examined in the combined ADHD/comparison group. As seen in Table 3, WJ-III Brief Achievement scores were positively correlated with SELF scores, such that youth with higher achievement scores were also more likely to have higher self-efficacy for learning beliefs. In contrast, scores on the Conners 3 Self-Report DSM-IV Inattention and YSR Internalizing Problems subscales were negatively correlated with scores on the SELF. Specifically, participants who reported more symptoms of inattention and internalizing problems were less likely to feel capable of applying the necessary self-regulatory strategies to deal with challenging learning situations.

3.4.2 Regression analyses.

A hierarchical liner regression was conducted in the full sample to determine whether self-reported symptoms of inattention predict self-efficacy for learning beliefs beyond achievement and internalizing difficulties. Brief Achievement scores on the WJ-III and YSR Internalizing Problems T-Scores were entered in the first block of the regression, followed by the Conners 3 self-reported DSM ADHD Inattentive T-scores. Results indicated that Brief Achievement and Internalizing Problems predicted a significant proportion of the variance in self-efficacy for learning ($R^2 = .354$, $F(2,56) = 15.34$, $p < .001$, $\beta = .260$, $p < .05$, and $\beta = -.459$, $p < .001$, respectively) before inattention was included in the model. When this variables was added in the second step, additional variance was predicted ($\Delta R^2 = .220$, $F(4,55) = 24.65$, $p < .001$), and overall achievement and internalizing difficulties were no longer significant ($\beta = .140$, $p = .149$, and $\beta = -.154$, $p = .164$, respectively). In the final step, only inattention was a unique predictor of self-efficacy for learning beliefs ($\beta = -.592$, $p < .001$).

3.4.3 Supplementary analyses.

Supplementary regression analyses were conducted to explore whether a) parent ratings of inattention predict SELF scores, and b) self-reported inattention was still a unique predictor of self-efficacy beliefs after controlling for IQ, gender, and mathematics achievement.
In the first regression, self-reported ADHD symptoms were replaced with parent-reports of youth’s symptoms of inattention. Brief Achievement scores on the WJ-III and YSR Internalizing Problems T-Scores were entered in step 1, and Conners 3 parent-reported DSM ADHD Inattentive T-scores were entered in step 2. Self-reported internalizing problems emerged as the only significant predictor of SELF scores \( \beta = -0.434, p = .001 \), whereas overall achievement \( \beta = 0.116, p = .424 \) and parent ratings of inattention \( \beta = -0.227, p = .122 \) were not. These results suggest that it is not others’ perceptions of the youth’s symptoms of inattention, but rather the youth’s perceptions themselves that is most important in predicting self-efficacy for learning beliefs. Youth who perceive themselves as struggling to pay attention also feel that they cannot cope with many learning tasks that require self-regulation.

In the second regression, WASI full scale IQ scores, WJ-III Brief Math scores, and gender were entered in the first step, followed by the Conner 3-Self-Report DSM ADHD Inattention scores. Results indicated that inattention remained as a unique predictor of self-efficacy for learning, \( \Delta R^2 = .365, F(4,55) = 16.77, p < .001, \beta = -0.647, p < .001 \). Gender \( \beta = 0.041 p = 0.671 \), IQ \( \beta = 0.086, p = .499 \), and math achievement \( \beta = 0.130, p = .999 \) were not significant predictors. These results suggest that self-reported inattention is critically important in understanding the self-efficacy for learning beliefs youth with and without ADHD.

4 Discussion

4.1 Group Differences in Self-Efficacy for Learning

The first objective of this study was to determine whether male and female youth with and without ADHD differ in terms of their self-efficacy for learning beliefs. Results showed that female adolescents with ADHD held lower self-efficacy for learning beliefs than their non-ADHD peers. Interestingly, male youth with ADHD did not report significantly lower self-efficacy beliefs than male youth without ADHD. Group differences in self-efficacy for learning had moderate to large effect sizes and this finding cannot be explained by
differences in overall academic achievement, as this variable was ruled out as a potential covariate in the analysis.

One important finding from the present research was that female participants with ADHD had significantly lower self-efficacy for learning beliefs than female youth without ADHD. Specifically, female youth with ADHD were only 50% confident (out of 100%) that they could regulate their learning effectively, whereas female youth without ADHD were around 76% confident in their self-regulatory skills. Importantly, their beliefs were also lower than the males with ADHD whose scores were closer to those of males without ADHD (65% and 69%, respectively). Previous research in typically developing adolescents and adolescents with LD has demonstrated that females have an advantage in terms of their self-efficacy for learning beliefs (e.g., Klassen, 2010; Pajares & Valiante, 2001; Vecchio et al., 2007; Zimmerman & Martinez-Pons, 1990). In the current study, this pattern was indeed observed in the comparison group. It appears, however, that in youth with ADHD, females are at a greater risk for low perceptions of confidence in their ability to cope with academic self-regulatory demands. Although the present pattern of results is not consistent with research in typically developing and LD youth, it is in line with findings from studies examining gender differences in self-esteem in students with ADHD (Rucklidge, 2010; Rucklidge & Tannock, 2001; Young et al., 2005). These studies have shown that female youth with ADHD have lower self-esteem, feel more ineffective, and are more affected by negative life events compared to adolescent males with ADHD. Thus, it may be that these negative self-perceptions also emerge when female adolescents are required to judge whether they are able to effectively cope with difficult learning situations. Previous research has also found that female youth with ADHD are more anxious and depressed than male youth with ADHD (Rucklidge, 2010); however, in the current study, female and male youth with ADHD did not differ significantly in terms of internalizing symptoms. This suggests that the lower self-efficacy beliefs of female adolescents with ADHD is not likely due to females feeling more anxious or depressed than male adolescents with ADHD.

It may be that female youth with ADHD rated their self-efficacy for learning beliefs lower than their male counterparts because they have more difficulties than males with self-regulatory tasks such as planning, self-monitoring, and goal setting. However, findings from
studies examining executive functions in youth with ADHD suggest that this is an unlikely explanation (Martel et al., 2007; Toplack et al., 2009; Wasserstein, 2005). Rucklidge (2010) recently reviewed the research on gender differences in ADHD and found that male and female youth with ADHD do not perform differently on measures of executive functioning, including planning, set-shifting, attention, working memory, and so forth. Gender differences in learning skills, such as note-taking, summarizing, test-taking, and study skills have rarely been examined; however, of the existing studies, no gender differences have been identified (e.g., Norvilitis et al., 2010). Therefore, rather than females with ADHD actually being more impaired than males with ADHD in their self-regulatory skills, an alternative explanation may be that female youth with ADHD may be more accurate in judging their self-regulatory skills compared to males. In other words, there may be gender differences in how overconfident male and female youth are in estimating their abilities. Male youth with ADHD rated their self-efficacy beliefs around 63% (compared to 68% in comparison males), suggesting that these students still perceived themselves as quite capable of tasks that require self-regulation. Given that underlying deficits in executive functions and self-regulation characterize male and female youth with ADHD (Martel et al., 2007; Toplack et al., 2009; Wasserstein, 2005), it is somewhat surprising that male youth with ADHD still judge themselves at least somewhat capable of performing tasks that rely on these processes. Female youth with ADHD, however, gave ratings closer to what would be expected based on their neuropsychological difficulties. Although it was beyond the scope of this study to determine whether there are gender difference in how overconfident adolescents with ADHD are in estimating their abilities, this is an important question for future research. It is well-known that children with ADHD exhibit a positive illusory bias when required to make judgments about their abilities (Owens et al., 2007), although less is known about whether there are gender differences in this bias. The current study suggests that males with ADHD may continue to overestimate their abilities once they enter adolescence, whereas female youth with ADHD may become more accurate at judging their confidence. Youth with LD have been found to be overly confident in judging their self-regulatory and academic skills, despite significant difficulties in these areas (Klassen, 2002; 2007; 2008). However, gender differences in the degree to which male and female youth with LD overestimate their confidence have not been found (Klassen, 2002). Given that youth with ADHD and LD both
experience academic and self-regulatory difficulties (e.g., Baird et al., 2009; Butler, 1998; Harris et al., 2004), the likelihood of a similar miscalibration between one’s beliefs and actual performance also occurring in youth with ADHD is highly plausible. Although optimistic self-beliefs may be adaptive for male youth with ADHD in the short-term because it may help protect their self-esteem, the long-term consequences may be maladaptive because it may prevent them from recognizing the need for improvement, and they may be less likely to seek help for their difficulties (Hoza & Pelham, 1995; Milich & Okazaki, 1991). Therefore, it is important to further understand the self-perceptions of youth with ADHD in order to develop effective recommendations for those who are concerned with enhancing the psychosocial and academic functioning of these students.

4.2 Predictors of Self-Efficacy for Learning

The second objective of this study was to examine predictors of self-efficacy for learning in youth with and without ADHD. In support of previous research and Bandura’s self-efficacy theory (1997), higher academic achievement was related to higher self-efficacy for learning, whereas higher internalizing difficulties were related to lower self-efficacy for learning. In addition, higher levels of self-reported symptoms of inattention were related to less optimistic self-efficacy beliefs. The results of the partial correlation analyses within each gender revealed that male and female youth who reported more inattention problems also reported lower self-efficacy for learning beliefs, even after controlling for their achievement levels and internalizing symptoms. Regression analyses within the full sample revealed that inattention was a unique predictor of self-efficacy for learning, above and beyond internalizing difficulties and achievement, accounting for 22% of the variance in self-efficacy scores. It is important to note that the effect of academic achievement and internalizing difficulties on self-efficacy for learning beliefs was eliminated once inattention was present in the model. Both internalizing difficulties and academic achievement have been found to play a strong role in the development of self-efficacy beliefs in both typically developing youth and youth with LD (e.g., Hampton & Mason, 2003; Usher & Pajares, 2006); however, it appears that symptoms of inattention may be uniquely important in predicting self-efficacy for learning among youth with ADHD.
With the onset of adolescence comes increased independence and a myriad of social, educational, and physical changes. Previous research has demonstrated that typically developing youth experience a loss of personal control and a decline in their self-confidence during this time (Caprara et al., 2008; Pajares & Valiante, 2002). Therefore, it is of no surprise that youth with high levels of inattention, who often experience more social, academic, and behavioural challenges compared to students with fewer attention problems (Nigg et al., 2005; Todd et al., 2002), are at a greater risk for lower self-efficacy beliefs. In other words, male and female youth who perceive themselves to have significant attention problems also appear to feel less confident in their ability to complete many tasks that require the effective use of self-regulatory skills. This finding is consistent with studies in community samples of adolescents and college students in which youth with elevated levels of inattention and hyperactivity-impulsivity displayed lower academic and career decision-making self-efficacy than youth in the comparison group (Norwalk et al., 2009; Norvilitis et al., 2010; Young et al., 2005). Previous studies examining self-perceptions in youth with ADHD have been limited to exploring self-esteem; however, our findings add to the literature by demonstrating that youth with ADHD who have higher levels of inattention also exhibit lower self-confidence in their ability to use self-regulatory skills to cope with challenges in the classroom.

That inattention is a significant predictor of self-efficacy for learning is not surprising given the growing consensus among researchers that symptoms of inattention are related to worse academic outcomes than are symptoms of hyperactivity (Nigg et al., 2005; Todd et al., 2002). For example, previous researchers have found that students with higher levels of inattention score lower on cognitive and achievement tests, have worse grades, more frequent placement in special education, and slower processing speed compared to students with higher levels of hyperactivity (e.g., Todd et al., 2002). Findings from the current study add to this literature by demonstrating that youth with ADHD who report significant attention problems also feel less efficacious about their ability to overcome learning challenges that are critical to academic success. Furthermore, there is research suggesting that individuals with ADHD with primarily inattention symptoms may be uniquely susceptible to deficits in executive functions compared to those with the primarily hyperactive-impulsive symptoms (e.g., Stavro et al., 2007; Wasserstein, 2005). Given the link between executive functions and
inattention, youth with more attention problems may have particular difficulties with tasks such as goal setting, planning ahead, self-control, and focusing attention. Therefore, it may be that underlying deficits in executive functioning account for the relationship between inattention and self-efficacy for self-regulated learning. In addition, once students with ADHD enter adolescence, inattention symptoms have been shown to remain constant, whereas symptoms of hyperactivity gradually subside (e.g., Mick et al., 2004). At the same time, students are transitioning into high school where they are expected to be self-directed and take responsibility for their own learning. The environment is far more demanding and less structured than in elementary school and there is more potential for distractions. To succeed academically, students must develop and effectively use skills in planning, organizing, goal setting, and so forth (Pajares & Urdan, 2006). Students with ADHD, particularly those who are more inattentive, may struggle to manage these diverse requirements and may consequently feel less confident in their self-regulatory skills.

4.3 Limitations and Future Directions

Findings from the current study must be considered in light of several limitations. Given the correlational nature of this research, causal conclusions cannot be made regarding the association between ADHD symptoms and self-efficacy for learning. In addition, the small sample size limits statistical power. With a larger sample, different gender effects may have emerged. The small sample size also limited the number of factors which could be entered into the regression analyses to predict self-efficacy for learning. It is widely accepted that ADHD is a heterogeneous population with high rates of comorbid disorders and multiple subtype classifications (American Psychiatric Association 2000; Barkley 1990). Previous research has demonstrated that along with comorbid depressive symptoms and academic achievement, co-occurring symptoms of aggression can also alter the self-beliefs of students with ADHD (see Owens et al., 2007, for a review). Specifically, researchers have shown that boys with ADHD with high levels of aggression tend to overestimate their competence to a greater degree than boys with ADHD and low levels of aggression, particularly in the social and behavioural domains (Hoza et al., 2002). Thus, it is important to consider the heterogeneous nature of ADHD in future research examining those factors that contribute to the self-beliefs of youth with ADHD.
Due to constraints surrounding data collection, we were unable to measure past academic achievements and emotional functioning in a manner that was faithful to Bandura’s (1993; 2000) description of these sources. For example, in reference to past academic achievement, Bandura emphasized students’ interpretations of experienced events rather than measures of objective performance (Bandura, 1993; 2000). Thus, instead of using academic achievement, a more precise measure of this construct may have involved asking participants to rate the degree to which they have successfully used self-regulatory skills and strategies to regulate their learning in the past (Usher & Pajares, 2008). Similarly, the current study used a measure of self-reported internalizing symptoms to closely approximate Bandura’s notion of emotional and physiological arousal. Again, a measure of this construct that is closer to Bandura’s interpretation may have involved asking youth to rate their feelings of anxiety, arousal, or depressed mood when faced with difficult learning situations in which they are required to employ self-regulatory strategies. According to Bandura (2000) predictors of self-efficacy are strongest when measured at the same level of specificity as the self-efficacy beliefs they are intended to predict. Furthermore, researchers may also find it fruitful to examine the role of other potential sources of self-efficacy in youth with ADHD. For example, Bandura (2000) noted that observational learning and verbal encouragement from others may also be important in the development of a healthy sense of self-efficacy. Indeed, previous research in youth with LD (e.g., Hampton & Mason, 2003) has found that these variables are important for understanding their self-efficacy for learning beliefs. Lastly, past research findings have shown that the relationship between various predictors of self-efficacy and self-efficacy beliefs may differ as a function of ethnicity (Klassen, 2004; Usher & Pajares, 2006). Although investigating this possibility was beyond the focus of the current study, this relationship deserves additional empirical attention.

Results from the present study highlight the importance of considering both gender and inattention symptoms in the self-efficacy for learning beliefs of youth with ADHD. Future research may profit from exploring whether other factors not directly assessed in the current study contribute to the formation of self-efficacy in male and female adolescence with ADHD. Specifically, researchers may find it beneficial to examine a model that assesses the relations among factors such as executive functions, comorbid diagnoses, or other sources of self-efficacy such as verbal encouragement and observational learning in predicting self-
efficacy for learning in this population. Furthermore, longitudinal studies in this domain would be ideal in expanding our understanding of the association between ADHD symptoms and self-efficacy beliefs. Researchers may also attempt to explore self-efficacy as a predictor of later academic outcomes in adolescents with ADHD. Although it is well-established in the typically developing literature that the beliefs students hold about their self-regulatory strategies powerfully influence their academic choices and performance (Bandura, 1993; Pajares, 1996), less is known about whether this relationship holds true in ADHD. Are youth with ADHD who have lower self-efficacy for learning beliefs less likely to remain in school than those with higher self-efficacy beliefs? Are optimistic self-efficacy beliefs in youth with ADHD a protective factor? Do youth with ADHD who have higher self-efficacy beliefs achieve better grades and are they more likely to effectively regulate their learning environment? These are important questions for future research, and the answers to these questions will not only help provide better support for adolescents with ADHD, but will also enhance our knowledge of how motivational factors function in these students.

4.4 Implications and Conclusions

This research was the first to examine the self-efficacy for learning beliefs of youth with ADHD and the mechanisms that underlie these beliefs. Despite the above limitations, this study provides researchers with preliminary evidence suggesting that youth with ADHD, particularly female youth and those with more severe attention problems, have less optimistic beliefs about their ability to regulate their learning and overcome challenging situations that may be present in the classroom. It is unclear from the present study as to why female youth with ADHD were particularly susceptible to lower self-efficacy beliefs compared to male youth with ADHD. As previously discussed, it may be that female youth with ADHD are more accurate in judging their self-regulatory skills, whereas male youth with ADHD may be overly positive in their evaluations. Alternatively, given that this study demonstrated a link between inattention symptoms and self-efficacy for learning, it is plausible that female youth with ADHD rated their self-efficacy beliefs lower than their male counterparts because they demonstrated more attention problems. Indeed, female youth with ADHD in the present study reported more symptoms of inattention compared to male youth with ADHD. Although the difference was not significant, it is possible that with a larger sample size, significant
group differences may have emerged. The next step for researchers in this area is to further our understanding of precisely how gender and inattention relate to influence the development of self-efficacy.

Findings from the present study have important practical implications. Specifically, this research suggests that educators and clinicians working with youth with ADHD might benefit from understanding their self-efficacy for learning beliefs, as these beliefs may be contributing to the academic difficulties experienced by these students. Future research may assist in this process by helping find practical ways in which those working with youth with ADHD may assess the self-efficacy for learning beliefs of these students. Moreover, clinicians and researchers must also work to develop appropriate interventions designed to alter the negative self-beliefs of youth with ADHD. For example, studies have shown that explicit training in the use of strategies promotes their acquisition and enhances self-efficacy for learning (Schunk & Rice, 1993). Although both male and female youth with ADHD are likely to benefit from training in self-regulatory skills given their difficulties in these areas, the present study suggests that there may be differences in how one might target the self-beliefs of these students. In female youth with ADHD, the focus may be on helping these students develop a more optimistic view of their self-regulatory abilities. In male youth with ADHD, however, the focus may be on making the link between performance and self-efficacy beliefs salient and helping these students become more realistic in their self-perceptions. Furthermore, as results from this study demonstrate, symptoms of inattention are a powerful source of self-efficacy for learning in youth with and without ADHD, even beyond academic skills and internalizing difficulties. Thus, helping students develop skills and strategies to improve their focus and attention may consequently boost their self-efficacy beliefs. Because symptoms of inattention have been known to remain stable throughout adolescence in students with ADHD (Mick et al., 2004), it is important for those working with students with attention problems to ensure that these students have both the skill and the confidence to regulate their learning before entering college or university in order to help them stay in school and reach their academic potential.

Youth with ADHD experience impairments in many skills required for self-regulation, including planning, goal, setting, and self-monitoring (e.g., Martel et al., 2007; Toplack et
Findings from the current study add to this literature by demonstrating that youth with ADHD also feel less confident in their ability to manage obstacles in their learning environment, particularly if they are female or exhibit greater attention problems. Unfortunately, students who lack confidence in their ability to self-regulate their learning are less likely to rely on adaptive strategies when faced with challenging tasks and they are more likely give up in the face of difficulty (Pajares, 1996; Zimmerman & Martinez-Pons, 1992). Poor self-efficacy for learning can also lead to learned helplessness, especially for students with physical, emotional, or intellectual difficulties (Gaskill & Hoy, 2002). Thus, the combination of a lack of skill and a lack of confidence can be particularly impairing for these students, especially given that self-regulatory processes are essential for healthy functioning not only in academic settings, but also in the world at large (Zimmerman, 1998). Adolescence appears to be a time where youth with ADHD do not hold positive perceptions of their skills and their abilities, and this can have a devastating impact on their academic performance, willingness to stay in school, and future vocational opportunities.
References


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Appendix
Adolescent and Parent Assent and Consent Forms and Letters

ADOLESCENT CONSENT LETTER

Dear ___________:

My name is Judith Wiener, and I am a professor at the Ontario Institute for Studies in Education of the University of Toronto (OISE/UT). My colleagues (Dr. Rosemary Tannock, Dr. Tom Humphries, Dr. Martinussen, and I are doing a research project on teenagers with Attention-Deficit Hyperactivity Disorder (ADHD). We are writing to ask you if you would like to take part in this research. For this, we need the participation of a group of teenagers who have been previously been diagnosed with ADHD and a group of teenagers without ADHD. We are asking you to take part in this research, because we believe that your feelings and opinions are valuable information.

Purpose of the Research

We want to learn more about the beliefs that teenagers have about ADHD and about behaviors that commonly occur with ADHD, their views about themselves, and their social relationships. So far, there is little research on these areas of study. We believe that knowing how teenagers think about their behaviors and about their ADHD is important, so that people like teachers, parents, and other professionals can consider their beliefs when they try to help them. This research has been funded by the Social Sciences and Humanities Research Council.

Description of the Research

If you take part in this research study, the testing session will take approximately 5 to 6 hours. The session will take place in a quiet room at OISE/UT. During the session, my research assistant will ask you to answer some questions about yourself, such as what you think about your behaviors, and about ADHD. He or she will read the questions to you if you wish. Sometimes he or she will write the answers down for you and sometimes you will have to check off or circle an item on a form or a questionnaire. You will also fill out some rating scales that tell about how you view yourself, your behaviors, your self-esteem and your relationships with peers and others. You will also do some reading, writing, and math activities. We will ask you to look at some pictures with a teenager in them behaving in different ways and ask you to point out which of the pictures are like you. We will also interview you about your beliefs about your behaviour and ADHD. We will give you a few breaks, including a lunch break. We are also going to send a rating scale for your teacher to fill out in a teacher package.

Benefits
A benefit of this study is that it will help us learn more about adolescents with ADHD. We want to listen to what you say and think, and then use that information to help other teens with ADHD.

Another benefit about this study is that your answers to the questions from the reading, writing, and math activities and the questionnaires will let us know what your strengths are and what areas you need to work on a little bit more. After about one month after you take part in the study, we will mail a report to you and your family about these different areas, and about some ways that might help you do better in school. Knowing these types of things is important, because they can help you, your parents and teachers understand how to help you do better in school and in life in general.

**Potential Harms and Withdrawal**

There are no harms associated with taking part in the study. The only thing that might happen is that you may feel a little uncomfortable talking about yourself and how you feel about some things. If you feel that you don’t want to answer some of the questions, you can tell the research assistant, and talk about it. You may also say that you want to stop, skip a question, or that you need a break and want to continue some other time. Also, if you say that you will take part in the study and then change your mind, that is okay. You can decide at any time to stop taking part in the study.

**Confidentiality**

Everything you tell me in the session will stay between you, the research assistant, and Dr. Wiener. No information that reveals your identity will be released without consent unless required by law. The information that we collect from you, your parents, and teacher will be analyzed and stored in locked files in a locked office. The data will be kept at OISE/UT in locked files for 10 years. The questionnaires will not have your name on them. A number code will be used in place of your name. We will analyze the information, talk about it at meetings, and write about it, so that parents, teachers, and doctors can learn from what we have found. The results of the questionnaires and activities described above will be used for research purposes only. We would need your permission and signed consent if you want to send these scores to another professional.

Because we are working with many teenagers on this project, people hearing our presentations or reading what we write will not know which teenager said what. When we do this, or when we publish our research in academic journals/books, we will only present group information. We will not tell anyone your name or give any information that could help them know who you are.

We will not be able to provide you with your responses on some of the questionnaires and interviews, because they were developed for the purpose of the research. We will not tell your parents the specific answers that you gave to the questions, but we will write a report about how you did and mail it to them.

The only time that we would have to tell somebody something you have said is if you tell us that you will do serious harm to yourself or someone else, or someone is seriously harming
you. In that case, as required by law, we would have to make sure you get help by contacting appropriate mental health, or law enforcement professionals. Otherwise, everything you tell me is kept confidential.

Compensation

Participation in research is voluntary. If you do decide to take part in the study, you can choose between getting $30.00 for your participation, or, (for teenagers in high school), the time you spend taking part in the study can be counted towards your community service hours, which we will provide a certificate for.

Access to Results

The results of this research will be shared in the form of a summary report upon completion of the study. We are in the process of developing a website on which we will place all relevant information and will contact you about this when it is ready.

You may contact Dr. Judith Wiener with any questions you may have about the study, and all of your inquiries will be addressed.

Sincerely,

__________________________
Judith Wiener, Ph. D
Program Chair
School and Clinical Child Psychology
(416) 978-0935
Department of Human Development and Applied Psychology
Ontario Institute for Studies in Education of the University of Toronto (OISE/UT)
Toronto, Ontario M5S 1V6
ADOLESCENT CONSENT FORM

“I acknowledge that the research procedures described above have been explained to me and that any questions that I have asked have been answered to my satisfaction. As well, the potential harms and discomforts have been explained to me and I also understand the benefits of participating in the research study. I know that I may ask now, or in the future, any questions that I have about the study. I have been assured that no information will be released or printed that would disclose my identity without my permission, unless required by law. I understand that I will receive a copy of this signed consent. I understand that participation is voluntary and I can withdraw at any time.”

I hereby consent to take part in this research.

___________________________________
Name of Teenager

__________________________________
Signature

__________________________________
Date

__________________________________
Name of person who obtained consent

__________________________________
Signature

The person who may be contacted about this research is:

__________________________________
who may be contacted at:

(416) 978-0933

“I agree to be contacted in the future regarding other studies being conducted by the ADHD Laboratory at OISE/UT.”

__________________________________
Signature

“I agree that the information collected about me in this study can be used for future data analysis provided that all identifying is removed and that I cannot be identified.”

__________________________________
Signature
ASSENT SCRIPT

Why are we doing this study?

My Professor and I are doing a research project on teenagers with ADHD. We are interested in finding out about how teenagers who have been given a previous diagnosis of ADHD think about their behaviours. We also want to know about their self-esteem and their social relationships. We want to learn more about the beliefs that teenagers have about ADHD and about some of their behaviours that commonly occur with ADHD. We believe that knowing how teenagers think about their behaviours and about their ADHD is important, so that people like teachers, parents, and other professionals can consider their beliefs when they try to help them. I am asking you to participate in this research, because I believe that your feelings and opinions are valuable information.

What will happen during the study?

If you take part in this study today, it will take approximately 5 to 6 hours. I will ask you to answer some questions about yourself, such as what you think about your behaviours, and about ADHD. I will read the questions to you if you want. Sometimes I will write the answers down for you and sometimes you will have to check off or circle an item on a form. Your answers to these questions will help me understand how you think about your behaviours and about ADHD. I will also ask you to look at some pictures with a teenager in them behaving in different ways and ask you to tell me which of the pictures are like you. I will ask you about your beliefs about those behaviours. We will also do some reading, writing, and math activities. Since you are here for a few hours, we will take a few breaks including a lunch break.

Your mother/father filled out a rating scale before you came in. I am also going to send a rating scale for your teacher to fill out.

Who will know about what I did in the study?

Do you know what confidentiality is? It means that everything you tell me today will stay between you, myself, and Dr. Wiener, who is my Professor. My Professor and I will analyze it, talk about it at meetings, and write about it, so that parents, teachers, and doctors can learn from what we have found. The questionnaires will not have your name on them. A number code will be used in place of your name. Because I am working with many teenagers on this project, people hearing my presentations or reading what I write will not know which teenager said what. When I do this, I will not tell anyone your name or give any information that could help them know who you are.

For the reading, writing, and math activities and the other questionnaires, I will not tell your parents the specific answers that you gave to the questions. But I will write a report about how you did and mail it to them.
The only time that I would have to tell somebody something you have said is if you tell me that you will do serious harm to yourself or someone else, or someone is seriously harming you. In that case, I would have to tell your parents and make sure you get help. Otherwise, everything you tell me is kept confidential.

**Participation in this study is your choice.**

Before you came here, your mother/father signed a letter saying that she/he agrees for you to be in the study, but you don’t have to participate if you don’t want to. If you say you will take part and then change your mind, that is okay. You can decide at any time to stop taking part in the study.

If you do decide to take part in the study, you can choose between getting $30.00 for your participation, or, (for participants in high school), the time you spend here can count towards your community service hours, which we will provide a certificate for.

**Are there good things and bad things about the study?**

There are no bad things about the study. The only thing that might happen is that you may feel uncomfortable talking about yourself and how you feel about some things. If you feel that you don’t want to answer some of the questions, you can tell me, and we will talk about it. You may also tell me that you want to stop, skip the question, or that you need a break and want to continue some other time.

A good thing about this study is that it will help us learn more about adolescents with ADHD. We want to listen to what you say and think, and then use that information to help other teens with ADHD.

Finally, your answers to the questions from the reading, writing, and math activities and the questionnaires will help me know what your strengths are and what areas you need to work on a little bit more. Knowing these types of things is important, because they can help your parents and teachers understand how to help you do better in school and will help you figure out what you can do for yourself.

**How do I find out the results of the study?**

If you want information about the results of this research when it is completed, you can check the website we are making for the research. We will let your parents know when it is ready. Your name will not be in the report, but it will give you an idea of how other teenagers think and feel about their behaviours and about ADHD.
Do you have any questions?

Do you agree to participate in this research?

“I was present when ____________________________ read this form and gave his/her verbal assent to participate in this study.”

Name of person who obtained assent:

________________________________

Signature

Date
Dear Parent:

My name is Dr. Judith Wiener. I am a Professor in the Department of Human Development and Applied Psychology at the Ontario Institute for Studies in Education of the University of Toronto (OISE/UT). I am writing to ask your permission for your adolescent to participate in a research project that I am conducting with my colleagues (Dr. Rosemary Tannock, Dr. Tom Humphries, Dr. Molly Malone, and Dr. Martinussen) about adolescents with Attention Deficit/Hyperactivity Disorder (ADHD). For this, we need the participation of adolescents who have been previously been diagnosed with ADHD as well as normally functioning adolescents.

**Purpose of the Research**

The purpose of this research to enhance our understanding about the self-perceptions of adolescents’ with ADHD including their self-esteem and self-concept, their beliefs regarding ADHD and about behaviors that commonly occur with ADHD, and their perceptions of their social relationships. Currently, little research exists on these areas of study. We believe that gaining a better understanding of the self-perceptions of adolescents with ADHD will help mental health professionals provide better services and develop appropriate interventions for them. This study is funded by the Social Sciences and Humanities Research Council of Canada.

**Description of the Research**

If you agree to allow your son/daughter to participate, my research assistants, who are graduate students in school and clinical child psychology, will work with him/her for a period of 5 to 6 hours in a quiet room at OISE/UT. He or she will complete a standardized educational test (Woodcock Johnson-Third Edition) that is recognized as being a valid measure of achievement in reading, writing and mathematics, and a brief cognitive measure (Wechsler Abbreviated Scale of Intelligence). He or she will also fill out several questionnaires designed to assess self-esteem, self-concept, peer relationships, social support, and problem behaviors that commonly occur with ADHD. He or she will also be asked to look at pictures with a teenager in them engaging in various behaviors characteristics of teens with ADHD and asked whether they are like the teenager in the picture. This will be followed up with an interview about his/her beliefs about why this behaviour is a problem, how controllable it is, how often it occurs, and whether it bothers other people. A similar interview will then be conducted about his or her beliefs about ADHD. The results of these measures will be used for research purposes only in the context of this study. We would need your permission and signed consent should you need to send these test scores to another professional involved in your case. With your permission we will also send the teacher who knows your son/daughter well a rating scale to complete. This rating scale assesses for symptoms of ADHD and other disorders.

The results of the educational and cognitive measures will be interpreted by a registered psychologist and be communicated to you in a written report. We will not be able to provide
you with your adolescent’s responses on some of the questionnaires and interviews, because they were developed for the purpose of the research and we will not know what individual adolescent’s scores mean until the data are collected and analyzed from all of the participants.

**Benefits**

The direct benefit of this study is that you will receive a report on your son/daughter’s educational and social-emotional functioning with specific recommendations for intervention.

We believe that the study may also indirectly benefit adolescents with ADHD. More specifically, enhanced knowledge about adolescents’ self-perceptions and beliefs about ADHD and ADHD-related behaviors may provide important information for parents, teachers, and clinicians working with them.

**Potential Harms and Withdrawal**

There are no known harms associated with participation in the study. The only potential risk is that your son/daughter may feel some discomfort when talking about his/her behavior. We will clearly inform him/her that he/she may decline to participate and that if he/she decides to participate, he/she may skip any questions, request a break, or withdraw from the study at any time. Following the session, if you find the discomfort to be more than minor, please contact us so that we can discuss how to provide support for him/her. In addition, should we feel, during or after the session that he/she would benefit from referral to a mental health professional, we would inform you of that recommendation and would provide an appropriate referral.

**Confidentiality**

Confidentiality will be respected and no information that discloses the identity of the participants will be released without consent unless required by law. For your information, all research files will be stored in locked files at OISE/UT. The results of the tests described above will be used for research purposes only. We would need your permission and signed consent should you need to send these scores to another professional.

The data we collect will be analyzed and stored in locked files in a locked office. The data will be retained at OISE/UT in locked files for 10 years. Your name and that of your son/daughter will be deleted and replaced by a number when filed in order to assure anonymity. In these ways, the information provided by you, your son/daughter and his/her teacher will be kept confidential. The one exception to this is in the event that your adolescent indicates that he/she might do serious harm to him/herself or others, or that he/she is being harmed. If that were to happen, as required by law, we would inform you and appropriate mental health, child protection, or law enforcement professionals.

When the results of this research are published in the form of scholarly presentation and/or academic journal/books, only group data will be presented, ensuring that it will be impossible for anyone to identify you or your son/daughter.
Compensation

Participation in research is voluntary. If your son/daughter chooses to participate in this study, he/she will receive $30 to defray expenses. If he/she is in high school, he/she may alternatively opt to count his/her participation in the study toward his/her community service hours; in this case, a certificate attesting to his/her participation would be provided. As mentioned above, you will also receive a report of your adolescent’s academic and social emotional competencies.

Access to Results

The results of this research will be shared in the form of a summary report upon completion of the study. We are in the process of developing a website on which we will place all relevant information and will contact you about this when it is ready.

You may contact Dr. Judith Wiener with any questions you may have about the study, and all of your inquiries will be addressed.

Sincerely,

__________________________
Judith Wiener, Ph. D

Program Chair

(416) 978-0935

Department of Human Development and Applied Psychology

Ontario Institute for Studies in Education of the University of Toronto (OISE/UT)

Toronto, Ontario M5S 1V6
**PARENTAL CONSENT FORM**

“I acknowledge that the research procedures described above have been explained to me and that any questions that I have asked have been answered to my satisfaction. As well, the potential harms and discomforts have been explained to me and I also understand the benefits of participating in the research study. I know that I may ask now, or in the future, any questions that I have about the study. I have been assured that no information will be released or printed that would disclose the personal identity of my son/daughter without my permission, unless required by law. I understand that I will receive a copy of this signed consent. I know that participation is voluntary and I can withdraw my adolescent at any time.”

I hereby consent for my son/daughter to participate.

___________________________________
Name of Parent

___________________________________
Signature

___________________________________
Date

___________________________________
Name of person who obtained consent

___________________________________
Signature

“I agree to be contacted in the future regarding other studies being conducted by the ADHD Laboratory at OISE/UT.”

___________________________________
Signature of parent

“I agree that the information collected on my adolescent in this study can be used for future data analysis provided that all identifying is removed and my adolescent cannot be identified.”

___________________________________
Signature of parent

"The person who may be contacted about this research is:"

___________________________________
who may be contacted at:

(416) 978-0933"
### Table 1

**Sample Characteristics of Male and Female Youth in the ADHD and Comparison Groups**

<table>
<thead>
<tr>
<th></th>
<th>Comparison Females ($n = 14$)</th>
<th>Comparison Males ($n = 17$)</th>
<th>ADHD Females ($n = 13$)</th>
<th>ADHD Males ($n = 18$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Age (years)</td>
<td>15.03</td>
<td>1.30</td>
<td>15.08</td>
<td>1.33</td>
</tr>
<tr>
<td>SES*</td>
<td>8.32</td>
<td>1.50</td>
<td>8.68</td>
<td>1.75</td>
</tr>
<tr>
<td>IQ (WASI Full Scale)<strong>a</strong></td>
<td>111.14</td>
<td>9.64</td>
<td>111.76</td>
<td>7.10</td>
</tr>
<tr>
<td>Overall achievement<strong>a</strong> <strong>b</strong></td>
<td>109.86</td>
<td>8.79</td>
<td>114.06</td>
<td>8.27</td>
</tr>
<tr>
<td>Mathematics achievement**(a+c)**</td>
<td>106.14</td>
<td>12.56</td>
<td>109.41</td>
<td>9.94</td>
</tr>
<tr>
<td>Writing achievement**(c)**</td>
<td>112.57</td>
<td>8.64</td>
<td>117.24</td>
<td>14.12</td>
</tr>
<tr>
<td>Reading achievement**(b)**</td>
<td>111.14</td>
<td>10.65</td>
<td>111.59</td>
<td>9.57</td>
</tr>
<tr>
<td>Self-reported internalizing difficulties**</td>
<td>44.08</td>
<td>5.20</td>
<td>47.94</td>
<td>11.14</td>
</tr>
<tr>
<td>Self-reported inattention<strong>a</strong></td>
<td>47.93</td>
<td>10.10</td>
<td>53.71</td>
<td>9.30</td>
</tr>
<tr>
<td>Self-reported hyperactivity-impulsivity<strong>a</strong></td>
<td>49.93</td>
<td>9.40</td>
<td>55.41</td>
<td>9.10</td>
</tr>
<tr>
<td>Parent-reported inattention**(c)**</td>
<td>50.86</td>
<td>6.30</td>
<td>49.65</td>
<td>8.30</td>
</tr>
<tr>
<td>Parent-reported hyperactivity-impulsivity**(c)**</td>
<td>53.07</td>
<td>8.29</td>
<td>50.59</td>
<td>7.91</td>
</tr>
<tr>
<td>Teacher-reported inattention**(c)**</td>
<td>50.46</td>
<td>10.53</td>
<td>51.87</td>
<td>13.90</td>
</tr>
<tr>
<td>Teacher-reported hyperactivity-impulsivity**(c)**</td>
<td>51.54</td>
<td>10.67</td>
<td>52.13</td>
<td>12.05</td>
</tr>
</tbody>
</table>

a. Significant group difference.  
b. Significant gender difference.  
c. Significant interaction.  

*p < .05. **p < .01. ***p < .001.
<table>
<thead>
<tr>
<th></th>
<th>Academic achievement (WJ-III Brief Achievement)</th>
<th>2</th>
<th>3</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Internalizing difficulties (YSR Internalizing Problems)</td>
<td>-.314*</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Self-reported inattention (Conners 3-SR DSM ADHD Inattentive)</td>
<td>-.350**</td>
<td>.557**</td>
<td>1.0</td>
</tr>
<tr>
<td>4</td>
<td>Self-efficacy for learning beliefs (SELF)</td>
<td>.408**</td>
<td>-.523**</td>
<td>-.717**</td>
</tr>
</tbody>
</table>

*p < .05.

**p < .01.

***p < .001.
Figure 1. Scores on the SELF as a function of gender and group status.