

Running head: TEACHER'S KNOWLEDGE AND BELIEFS REGARDING ADHD

Teachers' Knowledge and Beliefs regarding ADHD and Related Classroom Management
Practices

by

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Abstract

The current study examined the relationship between teachers' knowledge of and beliefs about Attention Deficit Hyperactivity Disorder (ADHD) and teachers' self-reported use of various instructional and behaviour management strategies in the classroom. While previous studies have examined the relationship between teachers' knowledge of and beliefs about ADHD, much less is known about the relationship between teachers' knowledge and beliefs regarding ADHD in connection with their use of classroom management strategies found to be effective in teaching these students. Participants in the study included 113 teachers from six school boards across Nova Scotia, who completed web-based questionnaires. The purpose of the study was to investigate the possible relationship between teachers' knowledge of and beliefs about ADHD and their use of specific instructional and behavioural management strategies. Findings indicated a relatively weak, but significant correlation between teachers' beliefs about ADHD and their use of instructional and behaviour management practices. Information gained from the study has implications for the content of teacher ADHD training programs as well as how to improve the classroom environment for students with ADHD.

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Literature Review

Characteristics of ADHD

Attention Deficit Hyperactivity Disorder (ADHD) is a persistent mental health condition affecting an estimated 3–7% of school-aged children (DSM-IV-TR, 2000). Specific subtypes of ADHD reflect mostly inattentive symptoms (Predominately Inattentive subtype), hyperactive and impulsive symptoms (Predominately Hyperactive-Impulsive subtype), or a combination of both symptom clusters (Combined subtype) (DSM-IV-TR, 2000). Inattentive behaviours greatly impact learning in the classroom and can include failure to listen to lessons and instructions, frequent shifting between tasks, and difficulties remembering to take home, complete, and hand-in homework and assignments. Behaviours relating to hyperactivity and impulsivity can also impact learning in the classroom and may include difficulty staying seated, frequent movement and fidgeting, and playing loudly in the classroom (Raggi & Chronis, 2006). Due to the nature of this disorder, ADHD is associated with lower academic performance, increased grade retention, increased rates of detention and expulsion, and higher rates of school dropout (Daley & Birch, 2010; Galera, Melchior, Chastang, Bouvard, & Fombonne, 2009; Loe & Feldman, 2007). In addition to academic and behavioural challenges, children and youth with ADHD are also at risk for strained social relationships, including difficult relationships with teachers, families, and peers (Eiraldi, Mautone, & Power, 2012).

In addition to core ADHD symptoms of inattention, hyperactivity, and impulsivity, many individuals with ADHD also suffer from other comorbid conditions including the following: learning disabilities (LD), anxiety, oppositional defiant disorder

(ODD), and/or conduct disorder (CD) (Daley & Birchwood, 2010). Furthermore, ADHD is associated with deficits in particular prefrontal executive functioning skills (Daley & Birchwood, 2010). Executive functioning (EF) includes skills such as working memory, organizing, planning, and response inhibition, which are generally understood as “a cluster of skills that are necessary for efficient and effective future-oriented behavior” (Diamantopoulou, Rydell, Thorell, & Bohlin, 2007, p.522).

The Impact of ADHD on Social Functioning and Academics

There is an abundance of literature documenting the many negative academic outcomes associated with inattention and hyperactivity as well as with diagnosed ADHD. These difficulties can begin early on and may persist throughout a student's academic career. Loe and Feldmen (2007) reviewed educational outcomes associated with ADHD and found that symptoms of ADHD are often reported in children as young as 3 to 6 years of age, and based on measures of academic readiness these children were often less prepared for academic aspects of school. These findings suggest that children with ADHD symptoms may be at a disadvantage before they even enter the school system.

Findings from longitudinal research suggest that children, who meet diagnostic criteria for ADHD in childhood, may go on to present with academic and social difficulties in adolescence. A recent study by Langberg, Molina, Arnold, Epstein, and Altaye (2011) used data collected as part of a larger, federally funded study, entitled the Multimodal Treatment Study of Children with ADHD (MTA). At the time of entrance into the larger study, all participants met DSM-IV criteria for ADHD–Combined type and were 7 to 9 years of age. This study examined data collected at the six and eight-year follow-up when mean ages were 14.9 and 16.8 years, respectively. The relationship

between different measures of academic outcomes and various predictor variables was investigated. Academic functioning was measured using both standardized achievement scores and school grades. Predictor variables included parent and teacher reports of ADHD and ODD symptom severity, classroom performance as measured by teacher reports on a standardized behaviour rating scales, parent reports of homework completion and management, use of special education services, ADHD medication use, parental and family factors, and a full scale intelligence score. When the relationships between predictor variables and measures of academic functioning were examined, different factors were related to the grades and scores on the standardized achievement tests. Homework management, teacher ratings of classroom performance, and parental education level were the strongest predictors of school grades; whereas, symptoms of inattention, intelligence scores, usage of special education services, and family income were the best predictors of scores on standardized tests of achievement. They also found that symptoms of inattention were more related to academic functioning than were symptoms of hyperactivity/impulsivity or oppositional defiant behaviours. Furthermore, analyses revealed that inattention impacted on academic performance (school grades) through its effect on homework management and classroom performance. The authors conclude that the relationship between ADHD symptoms and academic outcomes is mediated by classroom performance and homework management skills.

Some students with ADHD may be more likely than others to experience negative academic outcomes. In a large, longitudinal study, Barnard-Brak, Sulak, and Fearon (2011) examined rates of comorbidity for 2844 students with diagnoses of ADHD. They found that the disorders most commonly comorbid with ADHD included learning

disabilities and speech/language disorders. Data was collected at three different time periods, and rates of comorbidity increased over time. At the first point of data collection, 67% of students with ADHD had a comorbid disorder, whereas, the rate of comorbidity had increased to 92% at the third collection point. A significant relationship was also identified between rates of coexisting disorders and academic achievement scores, as measured by standardized tests of academic achievement for reading and math. More specifically, as rates of comorbidity increased over time, rates of academic achievement decreased. The authors conclude that their study builds on previous research that indicates a strong relationship between ADHD and academic difficulties by “indicating a negative association between having ADHD with a coexisting disorder and academic achievement across time” (Barnard-Brak et al., 2011, p.511). While students with ADHD are at risk for academic underachievement, it may be that those students with ADHD who also present with other comorbid disorders may fair even worse academically.

Scholastic challenges may not be limited to children who meet full diagnostic criteria for ADHD. A large Swedish study (Rodriguez et al., 2007) examined data from over 13,000 children, collected at ages 7-8 and 10-12 by the Nordic Network on ADHD. Mothers were recruited for the study during the early stages of pregnancy via government funded prenatal health services; the resulting sample consisted of children that were representative of the general population. In this study, Rodriguez and colleagues examined the relationship between children's ADHD symptoms and their academic functioning in reading, writing, and math. Teachers were asked to rate children's ADHD symptoms on a five-item standardized questionnaire. Academic functioning was

measured by teacher reports of students' abilities in reading, writing, and math.

Researchers examined the relationship between ADHD symptoms and academic performance for all children, irrespective of ADHD diagnosis. Results indicated strong associations between core ADHD symptoms and academic impairment in these children. Furthermore, consistent with previous research, academic impairment was more related to symptoms of inattention than it was to symptoms of hyperactivity.

There is also evidence that children with ADHD not only demonstrate significant impairment in comparison to typically developing children, but also in comparison to other children with different learning and behaviour challenges. In a large, federally funded study, McConaughy, Volpe, Antshel, Gordon, and Eiraldi (2011) examined the social and academic impairments of students aged 6-11 years with ADHD, in comparison to other clinic-referred children (without ADHD) and typically developing controls. Similar to other studies they found that in comparison to normal controls, children with diagnosed ADHD scored lower on all measures of academic performance, which included multiple parent and teacher reports of academic competence, as well as scores of academic skills development as measured by the reading, mathematics, and written language composites of a standardized achievement test. Children with ADHD also scored lower on all parent and teacher measures of social development compared to typically developing controls. When they examined children with ADHD in comparison to other clinic-referred children without ADHD, children with ADHD scored lower on three measures of academic functioning: teacher ratings of their performance in different academic subjects, teacher ratings of academic competence (including academic skills, motivation and effort), and the math composite score of the standardized achievement

test. In comparison to other referred children, children with ADHD also scored significantly lower on all measures of social behaviour. When children with ADHD were examined as a whole, 15–55% of children with ADHD demonstrated clinically significant impairment in the areas of academic performance measured and depending on the measure, 26–85% demonstrated clinically significant impairment in social functioning. Results of this study indicate that children with ADHD had significant difficulties with both the academic and social aspects of school in general and significantly more difficulties when compared to both typically developing controls and children referred for other learning and behaviour problems.

Clearly, ADHD can negatively impact on all aspects school life, and may contribute to behaviourally based problems, academic underachievement, and strained social relationships. It appears that symptoms of inattention have the greatest impact on academic achievement for children with ADHD. Children and youth with ADHD that also have additional comorbid disorders appear to be at an increased risk for negative outcomes. Due to the persistent nature of this disorder, it seems that the conclusion reached by Daley and Birchwood (2010) is appropriate ... “ADHD symptoms impact on academic achievement across the lifespan from school readiness to performance at University” (Daley & Birchwood, 2010, p.461).

Treatment of ADHD

Three main types of interventions have been identified in the literature as evidence-based treatments for ADHD: medication, behavioural interventions, and a combination of the two. The most common form of pharmaceutical treatment for the management of ADHD is stimulant medication, which has been shown to improve

behaviour and academic productivity in the classroom (Raggi & Chronis, 2006).

Behavioural interventions, such as token economies, have also been shown to be effective in improving classroom behaviour and academic outcomes (Fabiano et al., 2009).

Finally, interventions that include both medication and behavioural components are considered by many to be the most effective form of treatment for ADHD (Daly, Creed, Xanthopoulos, & Brown, 2007).

Pharmaceutical interventions. In a review of pharmaceutical treatments for individuals with ADHD, Findling (2008) concluded that “stimulants such as methylphenidate (MPH) and amphetamines are currently the most widely prescribed medications for ADHD, and their efficacy and tolerability in children and adults have been reported in numerous studies” (p. 943). More specifically, stimulants have been found to decrease disruptive behaviour and increase compliance, productivity, and on-task behaviour in the classroom. Furthermore, stimulants have been found to improve social behaviours by decreasing aggression, unsuitable peer interactions, and negative parental interactions (Raggi & Chronis, 2006). Findling (2008) further notes that nonstimulant medications, such as atomoxetine, have also been found to be effective in reducing symptoms of ADHD (although to a somewhat lesser extent) when stimulant medications have not been successful or well tolerated by individuals.

While pharmaceutical treatments for ADHD clearly have benefits, they are not without limitations. First, up to 30% of children will not respond positively to stimulant medications (Pelham & Gnagy, 1999). While stimulant medications have been shown to increase academic productivity and decrease negative social interactions, there is no evidence that stimulant medications are effective in increasing academic achievement or

improving peer relationships (Chronis, Jones, & Raggi, 2006). Adolescents may also be reluctant to follow their medication regime and may choose not to take medications at all (Chronis et al., 2006). There are also negative side effects associated with these medications including insomnia and suppressed appetite (Chronis et al., 2006; Corkum, Panton, Ironside, MacPherson, & Williams, 2008).

Behaviour interventions. Behaviour modification interventions involve modifying antecedents and consequences of behaviour to increase favorable behaviours and decrease undesirable behaviours. Two consequence-based interventions have received considerable support in the literature as effective strategies for use with children with ADHD: token reinforcement and response cost programs (DuPaul, 2007). Token reinforcement involves the immediate reinforcement of desired behaviours with tangible tokens, which can later be exchanged for rewards. Response cost programs are similar but also result in the loss of token reinforcers when inappropriate behaviours are performed. Token economies and response cost programs usually include three essential features: (1) target behaviours are clearly identified, often with pictures or words, (2) a set of predetermined actions is established for the delivery of reinforcement (e.g., tokens or points), and (3) a plan is in place for the exchange of tokens for reinforcers (i.e., prizes or activities) (Daly et al., 2007). In addition to these specific behavioural strategies, behavioural principles such as social learning theory, and classical and operant conditioning, can be applied more generally to classroom and home settings (DuPaul, 2007).

Fabiano et al. (2009) conducted a meta-analysis of one hundred and seventy-four studies that examined the effectiveness of behavioural interventions for children and

youth with ADHD. Studies included in the analysis investigated the efficacy of behavioural interventions in several environments (school, home, and recreational) and with various treatment targets (children, teachers, and parents). The researchers summarize the results from the meta-analysis: “across study designs and including different settings (e.g., home, school, recreational), a consistent pattern of results emerged – behavioral treatments improve the functioning of children with ADHD” (p.136). In this meta-analysis, outcome measures that improved as a result of these interventions included ADHD symptoms and related behaviours as well as academic outcomes.

Combination treatments. According to the literature, “combined or multimodal interventions often are viewed as the gold standard for ADHD treatment” (Daly et al., 2007, p.81). Many studies have demonstrated the effectiveness of combined medication and behavioural-based interventions for the treatment of ADHD. One of the largest studies to date was the “Multimodal Treatment Study for Children with ADHD,” which examined the effectiveness of four treatment programs with a sample of 579 children between the ages of seven and nine that were diagnosed with ADHD Combined Type (Chronis et al., 2006). Children were randomized to one of four treatment conditions: (1) behavioural intervention alone, (2) medication management alone, (3) combined medication and behavioural intervention, and (4) community care control condition. At the end of the 14-month treatment phase, results indicated that children in all four treatment groups demonstrated improvements; however, children in the medication management and combined treatment groups showed the greatest reduction in ADHD symptoms. There were also additional improvements seen in the combined group,

relative to the medication group, such that functional impairment in social areas improved. More specifically, children demonstrated improved social skills and parent relationships, and parents were less likely to report using ineffective and harsh parenting in the combined group. Additionally, children in the combined group required less medication than did those in the medication management treatment group (Chronis et al., 2006). Further, there was also evidence that the combined treatment was more effective for children with comorbid conditions, such as anxiety disorders. As well, parents of children in the combined and behavioural intervention groups had the greatest levels of satisfaction with treatment (Daly et al., 2007). Interestingly, once the treatment phase of the study ended, follow up studies revealed that two years later the significant advantages found in the medication and combination group were lost (Jensen et al., 2007).

Academic Interventions for Students with ADHD

Over the past few years there have been numerous literature reviews of school-based interventions for ADHD (Daley & Birchwood, 2010; DuPaul, 2007; DuPaul, Weyandt, & Janusis, 2011; Eiraldi et al., 2012; Jitendra, DuPaul, Someki, & Tresco, 2008; Raggi & Chronis, 2006; Reiber & McLaughlin, 2004; Schultz, Storer, Watabe, Sadler, & Evans, 2011). Within these reviews a number of interventions have been identified that show promise in improving both classroom behaviour and academic outcomes for children and adolescents with ADHD. These interventions include classroom management strategies, home/school communication, instructional modifications, homework-based interventions, and peer and parent tutoring.

Classroom management strategies. Classroom behavioural management strategies have been shown to be effective tools when teaching students with ADHD

(Daly et al., 2007). Based on behavioural principles (operant and classical conditioning, social learning theory) these types of interventions can include token economies, response cost programs, daily report card interventions, verbal praise and effective commands, or time out (Chronis et al., 2006). Token economies and response cost programs are often considered more involved strategies while less involved strategies, such as daily report cards, have also been shown to be effective in managing the behaviours of children with ADHD (Daly et al., 2007).

Home/school communication. One form of communication between the school and home is the Daily Report Card (DRC). This form of behaviour strategy involves identifying target classroom behaviours, recording and monitoring these behaviours, and then sending home frequent (usually daily) reports of the child's performance of those behaviours. If the child has reached his/her goal of doing or not doing certain behaviours, then the child is rewarded at home with either tangible rewards or a preferred activity (i.e., watching a favourite television program) (Schultz et al., 2011). DuPaul (2007) identified a number of factors that may improve the effectiveness of DRC interventions, which include selecting a reasonable number of goals (i.e. three or four), composing goals in a positive manner, making goals realistic and achievable, and providing consistent reinforcement when goals are achieved. Additionally, the effectiveness of DRC interventions relies on proper implementation, which should be monitored to ensure that teachers are completing evaluations daily, children are bringing them home, and parents are providing rewards based on performance of pre-established goals (Eiraldi et al., 2012). There is substantial support for the effectiveness of DRC

programs in improving both classroom behaviour and academic performance of children with ADHD (DuPaul et al., 2011).

Instructional modification. There is also evidence to suggest that adjustments and modifications to teaching methods and task structure can also have beneficial outcomes for students with ADHD. Instructional and task modification can include reducing the duration of tasks, providing choice in activities, adding colour and/or specificity to teaching materials, allowing for oral assessment (Daly et al., 2007), chunking information into smaller sections, breaking homework and assignments into smaller more manageable segments, and providing one-on-one instruction or customizing instruction to meet the needs of the child (Raggi & Chronis, 2006).

Homework-based interventions. There is evidence to suggest that homework plays an important role in promoting academic success. It has been suggested that, “aside from ability, time spent on homework is the best predictor of student grades and achievement” (Daley & Birchwood, 2009). Using a behaviour-based framework, Eiraldi et al. (2012) described the common components of effective homework interventions. Elements of the interventions are understood in terms of antecedents and consequences. Antecedent approaches include the teacher assigning reasonable amounts of homework that are individualized to meet the child's age, developmental level, and attention span. Other antecedent strategies take place in the home and include scheduling homework during time periods when the child's attention is greatest and when a parent is available to supervise the homework time. Additionally, homework should be done in a quiet area with minimal distractions. Strategies that act as both antecedents and consequences include goal setting and contingency contracting. Considerable research with general

populations of school-aged children has demonstrated the benefits of parent structured homework, goal setting and consultation between home and school in improving homework outcomes (Raggi & Chronis, 2006). Much less research has evaluated the efficacy of these strategies for children with ADHD; however, preliminary studies using the aforementioned strategies show promise in increasing homework accuracy and completion (Raggi & Chronis, 2006).

Peer and parent tutoring. Peer tutoring involves pairing a student diagnosed with ADHD with another student in the class to work on a specific academic task. The advantages of peer tutoring include one-on-one instruction, working at the individual's pace, and immediate feedback for errors and praise for correct responses. Positive social interaction may be an additional benefit to peer tutoring (Raggi & Chronis, 2006). Parent tutoring takes a similar form to peer tutoring but occurs in the home, often as part of a homework intervention.

Teachers' Knowledge, Beliefs, and Related Classroom Practices

We know from the literature that teacher behaviours can have a significant negative or positive impact on a child's school performance in behavioural, academic, and social areas. There is evidence to suggest that teachers' knowledge of ADHD will impact both teachers' beliefs and behaviours relating to ADHD. In the following section, a review of the relevant literature will be described to further explain the role that teachers' knowledge and beliefs can have on the treatment of this highly prevalent disorder.

Teachers' knowledge of ADHD. In studies that have examined overall teacher knowledge of ADHD, results have varied; some studies have found that teachers possess

a general lack of knowledge, while others have found teachers have adequate levels of knowledge in certain areas but are lacking in other areas. There is a dearth of research examining teachers' knowledge of ADHD in Canada; however, more is known about teachers' knowledge in the US and Australia.

In an Australian study, Ohan, Cormier, Hepp, Visser, and Strain (2008) found that primary teachers performed reasonably well on an ADHD knowledge test with teachers correctly answering 76% of items, on average. Teachers were most knowledgeable in the areas of ADHD diagnosis and symptoms but were lacking in their knowledge of treatment and causes of the condition. For example, 73% of teachers in this study incorrectly agreed with the statement "ADHD can often be caused by sugar or food additives." Similarly only 13% knew that diets were not helpful in treating ADHD. In another Australian study, West, Taylor, Houghton, and Hudyma (2005) found similar results when they examined ADHD knowledge of both primary and secondary school teachers. Teachers' responses indicated that they knew more about the causes and characteristics of ADHD than they did about the treatment of ADHD. In this study, most teachers again believed that diet could be used as an effective treatment for ADHD.

In a US study, Weyandt, Fulton, Schepman, Verdi, and Wilson (2009) examined the knowledge of general and special education teachers in eastern Washington State, and found that most general and special education teachers lacked general knowledge of ADHD and that general education teachers agreed with more false statement (i.e., statements that were not supported in the relevant research) than reasonable statements (i.e., statements that were empirically validated). Like their Australian counterparts, teachers in this study held misconceptions about the treatment of ADHD, and,

interestingly, the misconception most often held by teachers was that “special diets are effective treatments for ADHD.” In a study of elementary school teachers working in New York State, Sciutto, Terjesen, and Frank (2000) also found that teachers had the most knowledge of symptoms and the diagnosis of ADHD and had less knowledge of treatment options for ADHD.

Snider, Busch, and Arrowood (2003) in a US study, investigated general and special education teachers knowledge of ADHD, with an emphasis on knowledge of ADHD medication. They found no significant differences between special and general educators' knowledge of ADHD, with both groups performing poorly; more than half of the teachers answered only 5 items out of 13 correctly. Teachers were particularly uninformed about the risks of stimulant medications, such as possible negative side effects. Another recent US study, conducted by White, Sukhodolsky, Rains, Foster, McGuire, and Scahill (2011) examined elementary teachers' knowledge of Tourette's Syndrome (TS), Obsessive Compulsive Disorder (OCD) and ADHD. Scores on the ADHD items ranged from 0% correct to 100% correct, indicating a wide variability among elementary teachers' knowledge of ADHD. The mean score of correct ADHD items was 38%. When knowledge in all three areas was compared, on average, teachers' performed strongest in the area of OCD and were weakest in their knowledge of ADHD.

As mentioned above, there is a gap in the Canadian literature surrounding teachers' knowledge of ADHD. Given the relative similarities of teacher training in the US, Australia and Canada, it may be the case that Canadian teachers are also deficient in their understanding of ADHD. It would be important, however, to have research that

examines Canadian teachers' knowledge of ADHD and compare this to knowledge of American and Australian teachers.

Teachers' beliefs about ADHD. In a recent study conducted in a small Canadian city, Ohan, Visser, Strain, and Allen (2011) had elementary teachers and education students respond to four vignettes describing students that were exhibiting ADHD symptoms as defined in the DSM-IV. Two of the vignettes also included a statement that the student in the passage had a diagnosis of ADHD. Participants read the four vignettes and were asked to respond to questions that: (1) examined their perceptions of the severity of symptoms and social difficulties, (2) asked about their willingness to put in extra time and effort to help the student, and (3) asked about their emotional reactions to the student's behaviours. Labeling a child with ADHD had a significant effect on most (9 out of 11) of the follow-up questions. Both teachers and education students had more negative expectations for the student with the ADHD label; students with the label were rated as having more serious problems and more behaviour that would negatively impact on both the classroom and friendships. An ADHD label also increased participants' self-reported stress and decreased their confidence in managing the student's behaviours. There was one advantage of the ADHD label; it increased participants' willingness to assist with treatment. While generalizations cannot be made from one study, it appears that teachers' beliefs about ADHD may impact their behaviours toward these students.

Kos (2008) examined teachers' beliefs about ADHD and found that in general teachers believed ADHD to be a valid diagnosis and a legitimate educational problem. Teachers in this study also believed that students with ADHD should be taught in regular classrooms and that ADHD was diagnosed too often. Furthermore, it was reported that

these teachers held strong beliefs against the statements that children with ADHD misbehave because they are naughty and managing the behaviour of students with ADHD is easy.

Teachers' use of classroom based strategies. A recent, Canadian study by Martinussen, Tannock, and Chaban (2011) examined the frequency with which general and special education teachers used specific instructional and behavioural strategies in the classroom, which have been shown to be effective when teaching students with ADHD. Results of this study indicated that relatively few teachers (both general and special education) were using individualized behaviour management strategies on a frequent basis.

Teacher knowledge, beliefs and related behaviours. In an Australian study of teachers and education students, Bekle (2004) found that knowledge of ADHD was positively correlated with general beliefs about ADHD. To understand how different levels of knowledge may impact teachers' beliefs and behaviours, Ohan et al. (2008) grouped teachers into levels of ADHD knowledge and then compared them on a number of different factors. Teachers with high levels of knowledge were more likely to acknowledge the likelihood of ADHD impacting classroom and peer relationships. Teachers with high levels of knowledge were also significantly more likely to agree that these students would benefit from professional services and were more likely seek out professional services for these students. Conversely, teachers with low knowledge were significantly more likely to report that they would be able to handle students' problems without assistance. In other research, Sciutto et al. (2000) found that teachers'

knowledge of ADHD was positively correlated with their confidence in their ability to effectively teach ADHD children.

Demographic factors and teachers' knowledge of ADHD. Researchers have questioned whether different teacher factors, such as total number of years teaching, experience teaching students with ADHD, and educational opportunities are associated with ADHD knowledge. In the vast majority of studies, number of years teaching was not related to ADHD knowledge (Akram, Thomson, Boyter, & McLarty, 2009; Kos, Richdale, & Jackson, 2004; Ohan, et al., 2008; West, et al., 2005). However, contrary to the existing literature, Weyandt et al. (2009) found that it was participants (teachers and school psychologists) with fewer years of experience who demonstrated a significantly greater knowledge of ADHD compared to those with more years of teaching experience. The authors suggest that these findings reflect recent improvements in pre-service training and relate more to the date of graduation than to the duration of professional experience. In contrast, experience teaching students with ADHD has been associated with higher levels of ADHD knowledge in some studies (Bekle, 2004; Kos et al., 2004; Sciutto et al., 2000) but not others (Akram et al., 2009; Ohan et al., 2008; Vereb & Diperna, 2004). Training in ADHD has also been associated with greater knowledge of ADHD (Jones, & Chronis-Tuscano, 2008; Kos et al., 2004; West et al., 2005).

A review of literature indicates that certain demographic factors are likely associated with teachers' knowledge of ADHD; namely, experience teaching students with ADHD and teacher training in ADHD are likely both related to better knowledge of ADHD. Understanding which factors are associated with teachers' knowledge of ADHD

is of interest because ADHD knowledge may also be related to teachers' confidence, beliefs, and practices in the classroom.

Demographic factors and teachers' use of effective classroom practices.

Similar to findings from research examining teachers' knowledge, teaching experience often did not impact on teachers' reported classroom management practices for students with behaviour problems. However, general education teachers with more training in ADHD did have significantly higher scores on a measure of instructional and behaviour management use.

Theories of Reasoned Action and Planned Behaviour

Given that there are effective strategies for improving the functioning of children with ADHD in the classroom, there is interest in teachers' use of these helpful techniques. To better understand what motivates teachers to carry out these effective practices we now turn to theories of behaviour from social psychology.

It has been suggested that the most extensively studied model of behaviour is the Theory of Planned Behaviour (Armitage & Conner, 2001). The Theory of Planned Behaviour (TPB) explains that a combination of beliefs leads to the performance of specific behaviours. These include beliefs about the outcomes of a specific behaviour and the degree to which the individual finds these outcomes favorable. When combined, beliefs form the individual's "intention" to perform a behaviour. Ajzen (1991) explains, "intentions are assumed to capture the motivational factors that influence a behaviour; they are indications of how hard people are willing to try, of how much effort they are planning to exert, in order to perform a behavior" (p.181).

The TPB have been successfully applied to understand and predict numerous behaviours, including those relating to risky sexual behaviours, exercise frequency and drug use (Manstead, 2011). In a meta-analysis of 185 independent studies, Armitage and Conner (2001) found evidence to support the efficacy of the TPB in predicting behaviour. More specifically, they found a medium to large effect size, as the TPB explained 20% of the variance in observed behaviours across studies with different targets for change. For the purpose of the current study, the TPB will be the theoretical framework for which the impact of teacher beliefs' about ADHD on their use of instructional and behaviour management strategies are understood.

Gap in the Literature

As discussed above, effective strategies for teaching students with ADHD have been identified in the literature; however, it is unclear the extent to which teachers are engaging in these practices in the classroom. Furthermore, even less is understood about the possible factors that may be associated with the use of these evidence-based practices. According to relevant research and theories of behaviour, teachers' behaviours in the classroom are likely related to their beliefs, their knowledge, and to specific teacher demographic factors. To examine these areas, the following research questions were investigated: (1) how much specific knowledge of ADHD do teachers in NS possess? (2) What are the current beliefs about ADHD among teachers in NS? (3) At what frequency are teachers in NS using evidence-based instructional and behaviour management strategies in the classroom? (4) What is the relationship between teachers' knowledge of and beliefs about ADHD and teachers' use of instructional and behaviour management strategies? (5) What is the relationship between teachers' knowledge of and beliefs about

ADHD, teachers' use of instructional and behaviour management practices, and key teacher demographics?

Given the findings from relevant literature, it was expected that teachers would have a moderate amount of knowledge of ADHD and more specifically, that teachers would possess more knowledge of the symptoms and diagnostic criteria of ADHD. It was anticipated that teachers would have some positive beliefs about ADHD (e.g., that ADHD is a legitimate diagnosis and educational concern) and some negative beliefs (e.g., it's not easy to manage students with ADHD in the classroom). It was expected that teachers would be using some strategies, like modifying language for instruction, more often than others. More intensive behavioural strategies (e.g., behaviour contracts and daily report cards) were expected to be used less often by classroom teachers. With regard to relationships between factors, it was anticipated knowledge and beliefs would be related, and that certain demographic factors (i.e., teacher training in ADHD) would be also be related to teachers' knowledge, beliefs, and use of effective classroom strategies. Additionally, it was hypothesized that both teachers' knowledge and beliefs would be positively related to teachers' effective classroom practices.

Introduction

ADHD is a highly prevalent disorder in school-aged children with estimates of one student in every classroom having ADHD (Trout, Lienemann, Reid, & Epstein, 2007). Children with ADHD are at risk for comorbid conditions, such as learning disabilities, anxiety and behaviour disorders, and children with multiple disorders are at increased risk for negative outcomes (Daley & Birchwood, 2010). ADHD impacts not only behaviour in the classroom, at home, and in the community, but also has significant negative effects on academic achievement and social relationships with peers, family members, and teachers. Due to the nature of the disorder, ADHD often has a significant and persistent impact on learning and school functioning. As Daley and Birchwood aptly summarized... “ADHD symptoms impact on academic achievement across the lifespan from school readiness to performance at university” (Daley & Birchwood, 2010, p.461).

Numerous forms of intervention have been identified as effective in the treatment of ADHD, including medications (i.e., stimulants), behaviourally based interventions, and combinations of the two (Chronis, Jones, & Raggi, 2006). Additionally, specialized interventions in the school setting have also been found effective in improving both classroom behaviour and academic outcomes for children and adolescents with ADHD. These school-based practices include classroom behaviour management, instructional and task modifications, home-school communication plans, and peer and parent tutoring (Raggi & Chronis, 2006).

Although effective strategies for improving the functioning of children with ADHD in the classroom have been identified in the literature, it remains unclear as to whether teachers are using these techniques in the classroom, and if so at what frequency.

To our knowledge, only one study has been published directly addressing this question. In a Canadian study, Martinussen, Tannock, and Chaban (2011) examined the frequency with which general and special education teachers used specific instructional and behaviour management strategies in the classroom, which have been shown in the research to be effective in improving the classroom functioning of students with ADHD and behavioural problems. Results of this study indicated that relatively few teachers (both general and special education) were using individualized behaviour management strategies on a frequent basis.

There is a dearth of research exploring teachers' classroom practices in Canadian schools, and therefore, a key research goal of the current study was to investigate the frequency with which teachers in NS school boards are using evidence-based instructional and behavioural management approaches in their classroom.

To better understand what can be done to increase teachers' use of effective school-based approaches it would be beneficial to understand if there are any teacher factors that are associated with using these approaches. Theories of behaviour and findings from relevant research suggest that three possible factors could be related to teachers' use of empirically supported school-based interventions, and these include the following: (1) teachers' beliefs, (2) teachers' knowledge, and (3) specific demographic factors.

The first factor that was anticipated to be associated with teachers' use of effective approaches in the classroom is teachers' beliefs. According to the Theory of Planned Behaviour (TPB), an individual's "intention" or readiness to perform a behaviour is influenced by their "perceived behaviour control", which can be understood

as an individual's belief about their ability to perform a given behaviour. It was therefore hypothesized that teachers' beliefs about their competence in working with students with ADHD would positively correlate with their practices in the classroom.

When researchers have examined teachers' beliefs about ADHD they have found that, in general, teachers believe ADHD to be a valid diagnosis and a legitimate educational problem (Kos, 2008). Teachers have also expressed strong beliefs against the statement that children with ADHD misbehave because they are naughty (Kos, 2008) and have reported that a diagnosis of ADHD would increase their willingness to assist with treatment (Ohan et al., 2011). Research indicates that teachers generally believe that managing the behaviour of students with ADHD is difficult (Kos, 2008) and that students with ADHD have more serious problems and more behaviour that would negatively impact on both the classroom and friendships (Ohan, et al., 2011). Teachers have also reported increased stress and decreased confidence when managing the behaviours of students with ADHD (Ohan, 2011).

When researchers have examined the relationship between teachers' knowledge and beliefs regarding ADHD, they have found that knowledge of ADHD to be positively correlated with general beliefs toward ADHD (Bekle, 2004). Teachers with high levels of knowledge of ADHD have been found to be more likely to acknowledge the likelihood of ADHD impacting classroom and peer relationships, and were more likely to recognize the benefits of, and seek out, professional services for these students (Ohan et al., 2008). Teachers with low ADHD knowledge have been found to be significantly more likely to report that they would be able to handle students' problems without assistance (Ohan et al., 2008). Additionally, teachers' confidence in their ability to effectively teach children

with ADHD has been shown to be significantly correlated to knowledge of ADHD (Sciutto et al., 2000).

Seemingly there is evidence to suggest that teachers' knowledge of ADHD will impact both teachers' beliefs and behaviours relating to ADHD. Therefore, a second factor that was anticipated to be associated with teachers' use of effective approaches in the classroom was teachers' knowledge of ADHD. A further goal of the current study was to measure and describe Nova Scotian teachers' knowledge of and beliefs about ADHD, and to compare these with those findings from previous research.

The third factor thought to be related to teachers' practices in the classroom was specific teacher demographic factors. In the Martinussen et al. (2011) study mentioned above, researchers examined whether certain demographic factors were related to teachers' use of the effective instructional and behaviour management strategies. Results indicated that in-service training in ADHD and years of teaching were associated with the use of these empirically-based strategies. Therefore, another research goal of the current study was to examine the impact of teacher demographic factors (e.g., training in ADHD) on teachers' use of effective instructional and behaviour management approaches.

To achieve the research goals outlined above, a number of specific research questions were investigated.

Research Questions

1. How much specific knowledge of ADHD do teachers in NS possess?

It was anticipated that teachers' would have better knowledge of symptoms and diagnosis, and less general knowledge and knowledge of treatment of ADHD. These results would be consistent with research by Ohan, et al. (2008), Sciutto, et al. (2000),

and Weyandt, et al. (2009). It was also expected that teachers would be misinformed about food and diet, and believe that changes in diet are effective forms of treatment for ADHD, as Weyandt, et al. (2009) and Ohan, et al. (2008) found with teachers in their studies.

2. What are the current beliefs about ADHD among teachers in NS?

As per the findings of Kos (2008), it was expected that teachers would believe ADHD to be a valid diagnosis, and a legitimate educational problem. It was also anticipated that teachers would believe students with ADHD should be taught in regular classrooms, and that ADHD is diagnosed too often. Furthermore, it was expected that teachers would hold strong beliefs against the statements that children with ADHD misbehave because they are naughty, and that managing the behaviour of students with ADHD is easy.

3. At what frequency are teachers in NS using evidence-based instructional and behaviour management strategies in the classroom?

As per the findings by Martinussen et al., 2011, it was anticipated that teachers in the study would not be using individualized or intensive behaviour management strategies (i.e., response cost, behaviour contracts, and daily report cards) on a frequent basis. Also following the findings from the Martinussen et al. study, it was anticipate that the instructional approach that would be used most frequently would be modifying language for instruction. Overall, it was expected that the strategies that most teachers would be using on a frequent basis would include preferential seating, positive attention, and proximity control.

4. What is the relationship between teachers' knowledge of and beliefs about ADHD and teachers' use of instructional and behaviour management strategies?

Given what we know from theoretical models of behaviour (i.e., Theory of Planned Behaviour; TPB), it was anticipated that teachers' beliefs would impact on their use of instructional and behaviour management practices. It was also expected that teacher knowledge would positively related to teachers' self-reported use of instructional and behaviour management practices in the classroom, by way of the relationship between knowledge and beliefs.

5. What is the relationship between key demographic factors and teachers' knowledge of and beliefs about ADHD, and use of instructional and behaviour management strategies?

As per the findings of Bekle (2004) it was anticipated that knowledge of ADHD would be positively correlated with beliefs about ADHD. It was difficult to anticipate whether, or not, experience with students with ADHD would be related to teachers' knowledge of ADHD, as experience teaching students with ADHD has been associated with higher levels of ADHD knowledge in some studies (Bekle, 2004; Kos et al., 2004; Sciutto et al., 2000) but not others (Akram et al., 2009; Ohan et al., 2008; Vereb & Diperna, 2004). As per the findings of numerous previous studies (Akram, Thomson, Boyter, & McLarty, 2009; Kos, Richdale, & Jackson, 2004; Ohan, et al., 2008; West, et al., 2005) number of years teaching was not expected to be associated with knowledge of ADHD. It was anticipated that teacher training in ADHD would also be associated with knowledge of ADHD. As per Martinussen et al., (2011), training in ADHD was anticipated to be moderately associated with scores on the Instructional Approaches

subscale of the IBMAS, and it was also expected that there may be a relationship between years of teaching and score on the Instructional Approaches subscale.

Method

Data for the current study was collected as part of two larger research projects that were carried out at Dr. Penny Corkum's research lab: (1) *Teacher Help for ADHD*; and (2) *Barriers to Teacher Help for ADHD*. The total sample size contained 115 elementary school teachers from six school boards in Nova Scotia. Online survey software was used to gather information for the above mentioned studies. Information collected from four questionnaires was used in the current study: (1) Demographic Questionnaire, (2) Knowledge of Attention Deficit Disorders Scale (KADDS; Scitutto, Terjesen, & Frank, 2000), (3) Beliefs about Attention Deficit Hyperactivity Disorder (B-ADHD; Kos, 2008) and (4) Instructional and Behaviour Management Approaches Survey (IBMAS; Martinussen, Tannock, & Chaban, 2011).

The methods used in this study adhere to the Canadian Code of Ethics for Psychologists (CPA, 2000). The IWK Health Centre provided ethical approval for the two larger studies. The current study was also approved by the IWK Research Ethics Board and by the Mount Saint Vincent University Research Ethics Board.

Participants

The total sample size included 115 elementary school teachers instructing Grades One to Six (English Stream, with one teacher from French Immersion) in Nova Scotia elementary schools. Of these, 25 surveys were from the *Teacher Help for ADHD* study and 87 surveys were from the *Barriers to Teacher Help for ADHD* study. Teachers were recruited from six Nova Scotia school boards including the following: Annapolis Valley Regional School Board, Cape Breton-Victoria Regional School Board, South Shore

Regional School Board, Strait Regional School Board, Chignecto Central Regional School Board, and the Tri-County Regional School Board.

Measures

Knowledge of Attention Deficit Disorders Scale (KADDS). The KADDS is a 36-item scale developed by Sciutto, Terjesen, and Frank (2000) and was designed to measure teachers' knowledge of ADHD (see Appendix A). Subscales reflect content areas that were most relevant to teacher training in ADHD, and include (1) knowledge of symptoms/diagnosis, (2) knowledge of treatment of ADHD, and (3) general knowledge of the nature, causes, and outcomes of ADHD. Teachers demonstrate their knowledge in these areas by responding to statements as *true*, *false*, or *don't know*. All items included in the measure are empirically supported and well documented in the literature (Sciutto, et al., 2000). An expert panel of 40 upper-level clinical and school psychology doctorate students decided which subscale items fit in each of the three subscales. An item was considered part of a subscale if at least 75% of the panel agreed that the item fit in a given category.

During its design, the KADDS was administered twice and then modified to improve items and include a third response option (i.e., *don't know*). After these modifications had been implemented, results of a third administration of the KADDS indicated a strong internal consistency with Cronbach's $\alpha = .81$ (Bender, 1996, cited in Sciutto, 2000). In the Sciutto (2000) study, it was reported that Cronbach's $\alpha = .86$ for the total KADDS score and $= .71$ for the each of the individual subscales. Kleynhans (2005) found similar results with a Cronbach's $\alpha = .81$ for the total KADDS score. Sciutto et al. (2000) found high correlations between subscales and the total KADDS

score, ranging from $r = .85$ to $r = .91$. Similarly, Kleynhans (2005) found high correlations between the total score and subscales, which ranged from $r = .85$ to $r = .89$. Moderate correlations were found between subscales, which ranged from $r = .60$ to $r = .64$ (Kleynhans, 2005). Taken together these findings suggest strong internal consistency for both the total score and three subscales of the KADDS. The Scuitto et al. (2000) version of the KADDS was used in the current study.

The KADDS was used in the current study as a measure of teachers' general and specific knowledge of ADHD. More specifically, variables included the Total Knowledge score as well as scores on the subscales of General Knowledge, Symptoms/Diagnosis Knowledge, and Treatment Knowledge. Total Knowledge score has a minimum score of 0 and a maximum score of 35. The General Knowledge subscale has a minimum score of 0 and a maximum score of 15. The Symptoms/Diagnosis Knowledge subscale has a minimum score of 0 and a maximum score of 13. Teachers responded to knowledge statement by selecting the either *true* or *false*.

Beliefs about Attention Deficit Hyperactivity Disorder (B-ADHD). The B-ADHD (Kos, 2008) is a 31-item instrument designed to measure teachers' beliefs related to ADHD (see Appendix B). Teachers are asked to respond to negative statements about their beliefs regarding ADHD on a 5-point Likert-type scale, with anchors ranging from *strongly agree* to *strongly disagree*. Positive statements (seven in total) were reverse coded during scoring. No information about the construction of items was included in Kos' (2008) article. Kos (2008) explains that exploratory factor analyses were conducted and revealed the presence of seven underlying factors. Of the 31 original items, 27 items loaded significantly onto one of the seven factors with factor loadings ranging from .46 to

.89 for individual items. It was reported that her seven-factor model explained 59.6% of the variance in the measure (Kos, 2008). Factors were identified in the following seven areas: 1) lack of control, 2) negative classroom effects, 3) diagnostic legitimacy, 4) perceived competence, 5) influences to management, 6) expectations, and 7) external control. For a list of items contained in each factor and a description of each factor, please see Appendix C.

The B-ADHD scale was used in the current study as a measure of teachers' beliefs about ADHD; a total score for Beliefs was examined with high scores indicating more negative beliefs about ADHD. Additionally, subscale scores were also used to further understand teachers' beliefs relating to the seven factors. Furthermore, individual items were examined to understand teachers' responses to specific beliefs.

Instructional and Behaviour Management Approaches Survey. The IBMAS (Martinussen, Tannock, & Chaban, 2011) is a 33-item survey designed to measure teachers' use of a variety of instructional and behaviour management practices (see Appendix D). The items in the survey assess the frequency of teachers' use of instructional adaptations, instructional strategies, and behaviour approaches, which are often recommended for students with ADHD, learning, and/or behavioural problems. Items included in the measure describe strategies that were well documented in the literature as being effective and were consistent with those strategies identified as being effective in the present literature review. Teachers indicate the frequency with which they use the various approaches on a 5-point Likert scale ranging from *rarely* to *most of the time*.

When the IBMAS was analyzed in its original form, the resulting alpha level was .76 (Martinussen, et al., 2011). When five items were moved because of their low correlations with other items (item-total correlations below .20) the reliability of the measure improved; Cronbach's alpha reliability statistic was .80 for the behaviour management items and .89 for the instructional items (Martinussen, Tannock, & Chaban, 2011). In the current study, the IBMAS was used to measure the frequency of teachers' self-reported use of different instructional and behavioural strategies in the classroom. Specifically, scores from the Behaviour Management and Instructional Approaches subscales were examined, with higher scores indicating more frequent use of positive behaviour management strategies and instructional practices. The authors of the IBMAS have given permission for the measure's use in the current study.

Demographic questionnaire. An 18-item demographic questionnaire was designed as part of the larger studies mentioned above. The measure was used to gather relevant demographic information from teachers, including information about relevant training, teaching and classroom experience, and experience teaching students with ADHD (See Appendix E). For the purpose of the current study, information from the Demographic Question provided details about the sample of teachers in the study and served as both descriptive variables and independent variables in analyses.

Procedure

A password-protected Online Web Learning system (OWL, available through Dalhousie University) was used to collect data for the *Teacher Help for ADHD* study. Online survey software called Opinio (hosted on Dalhousie University's Web Server) was used to gather information for the *Barriers to Teacher Help for ADHD* study. In the

current study, questionnaire and demographic information from the two studies were compiled in SPSS for analysis.

Statistics

To address the first research question (how much specific knowledge of ADHD do teachers in NS possess?) descriptive statistics were used to describe teachers' knowledge of ADHD as measured by the KADDS (Sciutto, et al., 2000). More specifically, the mean percentage of correct items for the Total Knowledge score, and the three knowledge subscales (General Knowledge, Symptoms/Diagnosis Knowledge, and Treatment Knowledge) were calculated.

In addressing the second research question (what are the current beliefs about ADHD among teachers in NS?) descriptive statistics were also used to describe teachers' beliefs about ADHD as measured by the B-ADHD (Kos, 2008). More specifically, analyses included calculating means for the Total Belief score as well as means for seven different factors (lack of control, negative classroom effects, diagnostic legitimacy, perceived competence, influences to management, expectations, and external control).

To explore the third research question (at what frequency are teachers in NS using evidence-based instructional and behaviour management strategies in the classroom?) descriptive statistics were also used to measure the frequency at which teachers were self-reporting using instructional and behaviour management strategies as measured by the IBMAS (Martinussen, et al., 2011). More specifically, analyses included calculating means for the Instructional Approaches and Behavior Management subscales, and individual items in the measure.

To address the fourth research question (what is the relationship between teachers' knowledge of and beliefs about ADHD and teachers' use of instructional and behaviour management strategies?) correlations were computed to examine the relationship between teachers' knowledge of ADHD, teachers' beliefs about ADHD, and teachers' self-reported use of behavioural management practices and instructional supports in the classroom. Dependent variables included: (1) mean scores on the Instructional Approaches subscale of the IBMAS, and (2) mean scores on the Behavioural Management subscale of the IBMAS. Independent, or predictor, variables included scores from the following: (1) total and seven subscale scores of the B-ADHD, and (2) total and three subscale scores of the KADDS.

Finally, to investigate the fifth research question (what is the relationship between teachers' knowledge of and beliefs about ADHD, teachers' use of instructional and behaviour management practices, and key teacher demographics?) correlations were computed to investigate the relationships. Independent variables were key demographic factors including the following: (1) age, (2) gender, (3) highest educational degree, (4) length of teaching experience in years and months, (5) training in special education/exceptional learners, (6) ADHD training as part of teacher training, (7) number of students with ADHD taught in career, (8) inservice training in special education/exceptional learners, and (9) inservice training in ADHD. Additional independent variables included the following: (1) total and seven subscale scores of the B-ADHD, and (2) total and three subscale scores of the KADDS. Dependent variables included both the Instructional Approaches and Behaviour Management subscales of the IBMAS. Knowledge scores were additional dependent variables.

Results

Demographic Variables

The sample for the current study consisted of 115 teachers (101 female, 13 male, 1 missing data). Despite the stipulated inclusion criteria of having taught in elementary school, two teachers reported that they had not taught at the elementary level and were therefore excluded from the study. Refer to tables 1 and 2 for a comprehensive summary of demographic factors. The final sample included 113 teachers (99 female, 13 male, 1 missing data) who had all taught at the elementary school level. Additionally, teachers had experience teaching at the junior high level (67.3%) and the senior high level (40.7%). Teacher age ranged from 24 to 58 years, with a mean age of 42.5 years ($SD = 9.3$). Teaching experience ranged from less than 1 year to 35 years, with a mean of 15.5 years ($SD = 9.0$ years). Teachers' indicated that their highest level of education was Bachelor's (58.4%), Master's (32.7%), PhD (0.9%), and a small percentage indicated that they had *other* forms of education (6.2%). The majority of teachers were working full-time (80.5%), while less were working part-time (13.3%). There were a small number of resource/support teachers (9.7%), less learning centre (4.4%), even less supply teachers (1.8%), and a small percentage indicated that they were *other* types of teachers (8.8%).

As part of the demographic questionnaire, teachers were also asked about their personal history relating to learning about ADHD and teaching students with ADHD. All teachers had experience teaching at least one student with ADHD, and the mean number of students with ADHD taught was 21.26 ($SD = 24.16$). When asked about how much they had learned about ADHD in their teacher training, 44.2% felt they had learned *some*, 35.4% reported they had learned *very little*, 13.3% felt they had learned *nothing*, and only

6.2% reported that they had learned *a lot*. The majority of teachers (82.1%) reported that they had received support in dealing with their students with ADHD, and that this support had come from other teachers (46.0%), school psychologists (25.7%), the school system (21.2%), parents (14.2%), and clinical psychologists (8.0%).

Teachers also provided further details regarding their training. When asked if they had taken any courses in special education/exceptional learners, the number of courses taken ranged from none to 22 with a mean of 2.70 ($SD = 3.70$). Teachers had received more professional development in special education/exceptional learners than in ADHD. Professional development in special education/exceptional learners ranged from 0 to 300 hours, with a mean of 29.76 ($SD = 58.66$). Professional development in ADHD ranged from 0 to 50 hours, with a mean of 7.21 ($SD = 11.08$).

Teachers' Knowledge of ADHD

Refer to Table 3 for means, standard deviations, and minimum and maximum scores for teachers' knowledge. Total score on KADDS ranged from 25.71 % correct to 91.43 % correct, with a mean of 68.22% correct ($SD = 11.86$). Paired sample t-tests indicated that teachers performed differently on all three subscales of the knowledge questionnaire. More specifically, teachers performed better on the Symptoms/Diagnosis subscale than on both the Treatment subscale, $t(112) = 6.813, p < .001$, and the General Knowledge subscale, $t(112) = 12.498, p < .001$. Teachers performance on the Treatment subscale was better than on the General Knowledge subscale, $t(112) = 5.154, p < .001$.

Scores on the General Knowledge subscale of the KADDS ranged from 21.43% to 92.86%, with a mean of 61.00% ($SD = 14.70$). Additionally, questions on the KADDS were evaluated on an individual level (see Table 4). Teachers did well on some general

knowledge items. For example, most teachers were aware that “the majority of children with ADHD evidence some degree of poor school performance in the elementary years” (82.3% answered correctly). When presented with the statement, “if a child with ADHD is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework” 95.6% of teachers correctly identified this statement as false. Teachers did not perform as well on other general knowledge items. When presented with the statement, “children with ADHD are typically more compliant with their fathers than with their mothers” 69.0% of teachers did not answer this question correctly and were unaware that this statement is true.

Scores on the Symptoms/Diagnosis subscale of the KADDS ranged from 37.50% to 100.00%, with a mean of 79.98% and teachers had relatively good knowledge of the symptoms of ADHD. More specifically, the majority of teachers knew that children with ADHD are “frequently distracted by extraneous stimuli” (91.2% answered correctly), “often fidget or squirm in their seats” (94.7% answered correctly), and “often have difficulties organizing tasks and activities (94.7%).

Scores on the Treatment subscale of the KADDS ranged from 15.38% to 100%, with mean of 68.75% ($SD = 16.65$). Teachers had some areas of strength in regard to knowledge of the treatment of ADHD. When presented with the statement, “side effects of stimulant drugs (e.g., Ritalin) used for the treatment of ADHD may include mild insomnia and appetite reduction” the vast majority of teachers knew this to be true (98.2%). Almost all teachers (96.5%) knew that ADHD was not a result of ineffective parenting teachers. There were other items on the Treatment subscale in which teachers

more misconceptions. For example, when presented with the statement, “reducing dietary intake of sugar or food additives is generally effective in reducing symptoms of ADHD”, many teachers thought this statement was true (40.7%).

When asked how much they thought they knew about ADHD most teachers reported that they were moderately knowledgeable (53.6%), about a third felt they were a little bit knowledgeable (30.4%), a small group felt they were very knowledgeable (8.9%), and even less reported they were not very knowledgeable or unknowledgeable (7.2%). Teachers' perceived knowledge of ADHD was not significantly correlated with their Total Knowledge score, $r = .12$ ($p = .207$), their General Knowledge, $r = .045$ ($p = .637$), or their Symptoms/Diagnosis Knowledge, $r = -.043$ ($p = .651$); however, it was weakly correlated with their Treatment Knowledge, $r = .209$ ($p = .027$). Refer to Table 5 for correlations between teachers' perceived knowledge and their actual knowledge.

Teachers' Beliefs about ADHD

Teachers' beliefs were measured using the B-ADHD. The majority of items in the B-ADHD are statements representing negative beliefs. Higher mean scores for the total and subscale scores indicate more negative beliefs. Refer to Table 6 for the means, standard deviations, and minimum and maximum scores for the B-ADHD total and subscale scores. When presented with statements reflecting negative beliefs about ADHD, teachers' average ratings fell between *disagree* and *neutral* ($M = 2.54$, $SD = .30$) indicating that teachers were slightly more likely to disagree with negative statements than to agree with them.

Subscales scores represented teachers' beliefs about ADHD in seven areas. Teachers indicated the most negative beliefs on the External Control subscale ($M = 3.26$,

$SD = .53$), and the least negative beliefs on the Diagnostic Validity ($M = 1.79$, $SD = .60$).

A paired sample t -test indicated that the difference between these two subscales (the highest scored and lowest scored) was significant, $t(112) = -18.771$, $p < .001$.

In addition to subscale scores, individual items of the B-ADHD were also examined. Refer to Table 7 for mean, standard deviations, and minimum and maximum scores for individual items of the B-ADHD. In this section, individual items are presented in their original form indicating teachers' initial response to the items (i.e., positive items have not been reverse coded). In the following section, scores of approximately 2.0, or less than 2.0, are considered a disagreement. Scores of approximately 4.0 or more are considered an agreement. Subscale scores are presented in the manner in which they were designed and reflect agreement with negative scores. For the benefit of the reader, individual positive statements are presented in their original form (i.e., not reverse scored, as required for scoring).

As mentioned above, results from the Diagnostic Validity subscale were positive and teachers generally accepted that ADHD is a valid diagnosis. Teachers' mean scores for this subscale ranged from 1.00 to 4.25, with a mean of 1.79, $SD = .60$ (see Table 6). Individual items reveal that teachers agreed most with the statement, "ADHD is a valid diagnosis" ($M = 4.44$, $SD = 1.00$), and also agreed with the statement, "ADHD results in a legitimate educational problem" ($M = 4.05$, $SD = 1.09$) (see Table 7).

Mean scores from the Lack of Control subscale ranged from 1.20 to 3.50, with a mean of 2.17 ($SD = .46$) and indicated that teachers generally believe students with ADHD have little control over their own behaviour. More specifically, teachers disagreed with the negative statements, "students with ADHD could control their

behaviour if they really wanted to" ($M = 1.67$, $SD = 1.67$) and "students with ADHD should not be taught in the regular classroom" ($M = 1.79$, $SD = .84$). Teachers did however also disagree with the positive belief statement, "managing the behaviour of students with ADHD is easy" ($M = 2.03$, $SD = .65$).

As reflected in the Expectations subscales, teachers generally disagreed with negative statements about expectations for students with ADHD. Mean scores on this subscale ranged from 1.00 to 4.00 with a mean of 2.44 ($SD = .61$), indicating teachers had less negative beliefs about their expectations for students with ADHD. For example, teachers' disagreed with the statement, "you cannot expect as much from a student with ADHD as you can from other students" ($M = 1.83$, $SD = .68$).

Teachers' responses to statements in the Negative Classroom Effects subscale ranged from 1.00 to 4.60 and fell approximately in the *neutral* category, ($M = 2.70$, $SD = .78$). Teachers' beliefs about items in this subscale ranged. When asked to respond to the statement, "students with ADHD should be taught by specialist teachers, not classroom teachers" teachers generally disagreed ($M = 1.79$, $SD = .84$); however, teachers were less likely to disagree with the statement, "having a student with ADHD in my class would disrupt my teaching" and on average the response to this item was *neutral* ($M = 3.22$, $SD = 1.00$).

Teachers' total score for the Perceived Competence subscale ranged from 1.00 to 4.67 with a mean of 2.82 ($SD = .74$) and fell in the *neutral* area. Responses to all items in this subscale fell in the *neutral* area indicating that teachers did not generally believe that they possessed the skills or ability to effectively manage the students with ADHD in their class.

The Influences to Management subscale measured the extent to which teachers believed others (e.g., parents and teachers), would influence how they dealt with students with ADHD. Scores on this subscale ranged from 1.67 to 4.67 with a mean of 3.11 ($SD = .66$) and again fell in the *neutral* area for all items, indicating that teachers generally did not strongly agree or disagree with items in this subscale.

The External Control subscale measured teachers' beliefs about whether external things (such as medication and school policies) are required for the management of ADHD. Teachers' scores on this subscale ranged from 2.00 to 4.67 with a mean of 3.26 ($SD = .53$) and again fell in the *neutral* area ($M = 3.26$, $SD = .53$). Teachers responses to items in this subscale were generally neutral, however, teachers did not agree with the statement, "All children with ADHD should take medication" ($M = 1.9$, $SD = .79$).

Lastly, there are a number of additional items in the measure that do not fall under any subscale, but did provide additional insight into teachers' beliefs about ADHD. On one such item "ADHD is diagnosed too often" teachers' responses reflected a neither agreement nor disagree and fell in the *neutral* category ($M = 2.98$, $SD = 1.17$). Another item that teachers strongly disagreed with was, "students with ADHD misbehave because they are naughty" ($M = 1.38$, $SD = .54$).

Teachers' Use of Instructional and Behaviour Management Strategies

Refer to Table 8 for the means, standard deviations, and minimum and maximum scores for the IBMAS subscale scores. Items in the IBMAS described either an instructional or behaviour management strategies. Teachers indicated the frequency with which they used a strategy by selecting one of the following: 1 for *rarely*, 2 for *seldom*, 3 for *occasionally*, 4 for *frequently*, and 5 for *most of the time*.

Teachers' average ratings therefore fell between *occasionally* and *frequently* for both the Instructional Approaches and the Behaviour Management subscales, indicating that teachers are using these effective approaches at a moderate level. A paired samples *t*-test indicated that scores on the two subscales were not significantly different, $t(112) = .785$ (.434). The two IBMAS subscales were highly correlated, $r = .659$ ($p < .001$).

Scores for the Instructional Approaches subscale ranged from 1.84 to 4.68, with a mean of 3.41 ($SD = .54$). Specific items of the IBMAS were also examined. Refer to Table 9 for the means, standard deviations, and minimum and maximum scores for each item of the IBMAS. Teachers were using some instructional practices at approximately a *frequent* level. Teachers reported modifying language used for instruction ($M = 4.12$, $SD = .76$), providing concrete cues and visual supports ($M = 3.96$, $SD = .85$), chunking assignments into smaller sections ($M = 3.85$, $SD = .87$), providing more immediate and frequent feedback to students ($M = 3.83$, $SD = .66$), explicit strategy instruction ($M = 3.79$, $SD = .89$), and simplifying instructions and giving them in a step by step manner ($M = 4.12$, $SD = .72$). Additionally, teachers' indicated that they were seldom using choral response techniques ($M = 2.08$, $SD = 1.03$).

Scores for the Behaviour Management subscale ranged from 2.21 to 4.42, with a mean of 3.44 ($SD = .44$). Teachers' reported using the following strategies more often: providing positive teacher attention ($M = 4.41$, $SD = .62$), providing preferential seating ($M = 4.32$, $SD = .67$), providing assistance during transitions ($M = 4.04$, $SD = .67$), using non-verbal cues to refocus student on task ($M = 4.13$, $SD = .69$), and communicating frequently with parents ($M = 3.80$, $SD = .83$). Teachers reported that they seldom used response cost behaviour management ($M = 2.20$, $SD = 1.20$), and only used daily report

cards ($M = 2.80$, $SD = 1.21$) and behavioural contracts ($M = 3.05$, $SD = 1.18$) with occasional use.

Knowledge, Beliefs and Use of Instructional and Behaviour Management Strategies

There were no significant correlations between knowledge scores on the KADDS (total or subscales) and either of the IBMAS subscales (see Table 10). Refer to Table 11 for the correlations between beliefs about ADHD and use of instructional and behaviour management strategies. There was a small significant relationship between the Total Beliefs and self-reported use of Behaviour Management practices, $r = -.22$, ($p = .020$). A small significant correlation was also found between the Expectations beliefs subscale and use of Behaviour Management subscale, $r = -.19$, ($p = .046$). The majority of statements that comprise the B-ADHD represent negative beliefs (e.g., “Students with ADHD could control their behaviour if they really wanted to”) and, as such, lower scores on the B-ADHD reflect more positive beliefs about ADHD. Therefore, these negative correlations reveal that as teachers’ negative beliefs about ADHD decrease their scores on the Behaviour Management subscale increase. There were no other significant correlations between the remaining beliefs subscales and either the Instructional Approaches or Behaviour Management subscales.

Demographics, Knowledge, Beliefs, and Instructional and Behaviour Management Practices

Refer to Table 12 for correlations between teachers’ subscale and Total Knowledge scores on the KADDS and teachers’ subscale and Total Beliefs scores on the B-ADHD. There was no relationship between teachers’ Total Knowledge score and teachers Total Beliefs scores, $r = -.07$, $p = .468$; however, significant correlations were

found between the Diagnostic Validity beliefs subscale and the following: Total Knowledge scores ($r = -.24, p = .010$), Symptoms/Diagnosis Knowledge ($r = -.23, p = .015$), and Treatment Knowledge ($r = -.20, p = .032$). As well, a significant correlation was found between the Expectations beliefs subscale and Symptoms/Diagnosis Knowledge ($r = -.20, p = .030$).

Refer to Table 13 for correlations between teacher demographics and knowledge, and teacher demographics and beliefs regarding ADHD. Teacher gender, age, and length of teaching were not related to teachers' scores on the Knowledge and Beliefs measures. Additionally, amount learned about ADHD during teacher training, and the number of children with ADHD taught during the teachers' career, were also not correlated with scores on the Knowledge and Beliefs measures. Number of hours of professional development training in special education/exceptional learners was not related significantly to either the Knowledge or Belief scores; however, number of hours of professional development training in ADHD was significantly related to Beliefs scores, $r = -.25$ ($p = .007$). Number of courses in taken special education/exceptional learners was also significantly correlated with beliefs, $r = -.24$ ($p = .011$). Highest level of education was correlated to both knowledge, $r = .23$ ($p = .016$), and beliefs, $r = -.26$ ($p = .006$).

Refer to Table 14 for correlations between teacher demographics and scores on the IBMAS subscales. Teacher age, gender, level of education, and duration of teaching were not significantly related to either the Instructional Approaches or the Behaviour Management subscales. Number of children taught with ADHD was also not significantly related to either the Instructional Approaches or the Behaviour Management subscales. Number of hours of professional development training in special

education/exceptional learners was not related significantly to either the Instructional Approaches or the Behaviour Management subscales; however, number of courses taken in special education/exceptional learners was significantly related to both Instructional Strategies, $r = .23$ ($p = .018$), and the Behaviour Management, $r = .22$ ($p = .020$).

Number of number of hours of professional development training in ADHD was weakly related to both subscales of the IBMAS, and only significantly to the Behaviour Management subscale, $r = .21$ ($p = .029$) but not to the Instructional Strategies subscale, $r = .18$ ($p = .052$). Amount learned about ADHD in teacher training was significantly correlated with scores on Instructional Strategies subscale, $r = .25$ ($p = .009$), but not the Behaviour Management subscale, $r = .12$ ($p = .207$).

Discussion

The purpose of the present study was to: 1) provide an overview of Nova Scotian teachers' knowledge and beliefs regarding ADHD, and teachers' use of effective instructional and behaviour management strategies in the classroom; 2) examine the relationship between teachers' knowledge and beliefs regarding ADHD and teachers' use of effective instructional and behaviour management strategies in the classroom; and 3) explore the relationships between key teacher demographic factors with teachers' knowledge and beliefs regarding ADHD, and teachers' use of instructional and behaviour management strategies. Based on questionnaire data collected from Nova Scotian teachers, it was found that teachers had more knowledge of the symptoms and diagnosis of ADHD, and had less knowledge of the general facts of ADHD and treatments for ADHD. Teachers had slightly more positive beliefs than negative ones, and beliefs concerning the diagnostic validity of ADHD were particularly positive. Teachers' reported occasional use of evidence-based instructional and behaviour management practices; however, some were reported to be used more frequently than others. Moreover, the use of these strategies was weakly correlated with teachers' beliefs about ADHD and several demographic factors.

Teachers' Knowledge of ADHD

Teachers were lacking in their overall knowledge of ADHD, and answered an average of 68% of questions correctly. Teachers' knowledge of ADHD was consistent with previous results in the literature, which found a range of 76% (Ohan, et al., 2008) to less than 50% (Weyandt et al., 2009) correct responses, depending on the study and the measure used. Teachers in the present study knew the most about the symptoms and

diagnostic criteria of ADHD, less about treatment, and the least about general facts about ADHD. Other studies have found similar results indicating that teachers often have the most knowledge of the symptoms and diagnosis of ADHD, and less general knowledge and knowledge of the treatment of ADHD (Ohan, et al., 2008; Sciutto, et al., 2000; & Weyandt, et al., 2009).

There were some areas in which teachers generally possessed more knowledge. Teachers in this sample had relatively strong knowledge of the symptoms of ADHD. Teachers correctly identified salient symptoms of ADHD, and the vast majority of teachers were aware that children with ADHD are “frequently distracted by extraneous stimuli”, “often fidget or squirm in their seats”, and “often have difficulties organizing tasks and activities.” Teachers also performed well on other items that related to what they would likely experience and observe in the classroom. For example, most teachers understood that just because a student with ADHD is able to sustain attention during favored tasks, such as watching TV or playing video games, this does not mean that they would be able to sustain attention for the same amount of time while completing homework or school assignments.

Additionally, the vast majority of teachers were aware of the side effects of stimulant medications, and were cognizant of the fact that students with ADHD usually have some degree of poor school performance during elementary school. It appears that teachers' knowledge is very strong in areas where teachers likely have first hand experience. Furthermore, teachers were knowledgeable in other critical areas that would likely be beneficial to their students and their students' families. For example, the vast majority of teachers knew that ADHD was not a result of ineffective parenting. Having

teachers understand that parents are not the cause of their child's ADHD would be beneficial in fostering positive relationships between parents and teachers.

A common misconception held by teachers is that sugar or food additives can cause ADHD and the removal of these additives can be an effective form of treatment for ADHD. In the present study, approximately 41% of teachers agreed with this statement. Although this represents a large proportion of teachers holding this misconception, our sample of teachers seemed to be more informed than samples in previous research that found rates as high as 73% of teachers believing that changing diet could improve ADHD symptoms (Ohan, et al., 2008).

Teachers are often a source of information for parents, and teachers may provide recommendations to parents regarding the learning and behaviour of their children. This may be especially true with respect to ADHD, which is a disorder that is often first identified by teachers in the school setting (Chaban & Tannock, 2009). Furthermore, according to the findings of the present study teachers reported that they were frequently in communication with parents as a method of managing students with attention and/or behavioural difficulties in their classroom. If teachers are misinformed about the causes and treatments for ADHD, this could result in parents and other school staff receiving inaccurate information about the disorder. This may cause frustration to parents if, for example, a parent makes the effort to alter a child's diet and symptoms do not improve.

Another common misconception with this sample was that medical doctors have specific diagnostic tests that can definitively diagnose ADHD. Only 37.2% of teachers correctly identified this statement as false. This misinformation is important because teachers often provide essential information in the diagnosis of ADHD (Chaban &

Tannock, 2009). To receive a diagnosis of ADHD, symptoms of inattention or hyperactivity/impulsivity must be present in two or more settings (DSM-IV-TR, 2000), and this usually includes gathering information from both the home and school settings as this is where children and youth spend the majority of their time (Chaban & Tannock, 2009). Teachers may not be aware of the importance of the information that they provide about students to health and mental health professionals (i.e., psychologists, pediatricians, psychiatrists, etc.) if they assume that, in the end, professionals are relying on specific tests to make a diagnosis of ADHD.

In summary, teachers in this sample had some strengths in their knowledge of ADHD, and the vast majority of teachers could identify the key symptoms of ADHD, were aware that most students with ADHD will struggle in some way during the elementary school years, and understood that ADHD is not caused by ineffective parenting. It would be logical to presume that this type of knowledge would help teachers effectively identify students that may have ADHD and facilitate positive relationships with parents. While teachers possessed adequate knowledge of the symptoms and diagnosis of ADHD, they were lacking in areas of general knowledge of ADHD and in their understanding of effective treatments for ADHD. It is especially concerning that teachers' hold certain false beliefs, which may interfere with the diagnosis and effective management of ADHD. These include the belief that modifying diet to remove sugar and food additives is an effective treatment for ADHD, and the belief that medical professionals have specific diagnostic tests that can definitively diagnose ADHD.

Teachers' Beliefs about ADHD

Teachers held slightly more positive than negative beliefs about ADHD. When beliefs in seven separate areas were examined, teachers had more positive beliefs in three areas. Firstly, teachers indicated that they generally accepted the diagnostic legitimacy of ADHD. Secondly, teachers agreed more positively to beliefs suggesting that the behaviour of children with ADHD is often out of their own control. Lastly, teachers did not agree that they had fewer expectations for students with ADHD, indicating more positive expectations for these students. On all other subscales, teachers' responses indicated that they were generally *neutral*, and neither agreed or disagreed with the beliefs regarding the Negative Classroom Effects of children with ADHD, their Perceived Competence in working with students with ADHD, their Influences to Management when dealing with students with ADHD, and the extent to which ADHD requires External Control.

As anticipated, teachers generally held a number of positive beliefs about ADHD. More specifically, teachers believed that ADHD is a valid diagnosis and a legitimate educational problem. Additionally, as expected teachers also believed that children with ADHD should be taught in regular classrooms and did not believe that ADHD children misbehave because they are naughty. In contrast to findings of others (Kos, 2008) teachers in the present study did not necessarily believe that ADHD was diagnosed too often. As for negative beliefs, teachers did not believe that managing the behaviour of students with ADHD is easy, and did not feel that they possessed the necessary skills and abilities to effectively deal with students with ADHD in their class.

Teachers held a number of positive beliefs about their students with ADHD. These beliefs likely have positive implications for students with ADHD in their classes. For example, teachers believed that ADHD is a real disorder and considered the behaviours of students with ADHD to be out of their own control. Teachers with these beliefs may be more likely to treat these students in a compassionate and patient manner. Teachers' who hold these beliefs may also be more likely to attempt to use strategies to assist these students, as opposed to punishing them for "bad behaviour". Teachers also indicated that they did not have decreased expectations for their students with ADHD. This belief implies that teachers may also not accept less from these students. Teachers did agree with a number of negative statements about ADHD. Teachers did not believe that students with ADHD were easy to teach, and did not believe that they had the skills and abilities to manage the behaviour of these students effectively. These beliefs may result in stress and decreased confidence with dealing with students with ADHD.

Teachers' Use of Instructional Approaches and Behaviour Management Practices

Teachers use of instructional and behaviour management practices were consistent with findings from the previous literature (Martinussen, et al., 2011). Teachers reported using behaviour management and instructional approaches with the same frequency, between *occasional* and *frequent* use. More specifically, teachers were not using intensive behaviour management strategies (i.e., behaviour contracts, daily report cards and response cost) very often. As expected, the instructional approach teachers were using most often was modifying language for instruction. Also as expected, teachers reported frequently using preferential seating, positive attention, and proximity

control in the classroom. Teachers were also using nonverbal cues to refocus students' attention and were providing assistance during transitions, on a frequent basis.

There were many empirically supported strategies that teachers did not report using on a frequent basis. A number of reasons could explain why teachers are not using these techniques more often. Some of these strategies (e.g., response cost programs, and choral response techniques) may require teachers to have specific training in order for these approaches to be implemented and maintained effectively. Additionally, other approaches may require additional time for teachers to instruct students in a one-on-one setting (e.g., teaching students how to self-monitor and self-evaluate behaviour, helping students to monitor and set goals, and teaching students how to use an assignment notebook). Furthermore, other strategies (e.g., providing advanced organizers for content, and adjusting materials for the student) may require additional preparation time.

Numerous strategies have been identified in the literature as being effective for improving both behavioural and academic outcomes for students with ADHD. These interventions include classroom management strategies, home/school communication, instructional modifications, homework-based interventions, and peer and parent tutoring (Daly, et al., 2007; DuPaul, 2007; Eiraldi, et al., 2012; & Raggi & Chronis, 2006).

Research also informs us that students with ADHD are at risk for various negative outcomes at school, including academic, behavioural and social challenges (Daley & Birch, 2010; Galera, et al., 2009; Loe & Feldman, 2007). When teachers are not using evidence-based strategies in their classrooms, their students with ADHD are not being provided with the optimal interventions that may enhance both their learning and functioning at school.

Teachers' Knowledge, Beliefs and Use of Instructional and Behaviour Management Practices

The Theory of Planned Behaviour stipulates that beliefs precede behaviours. It was therefore anticipated that teachers' beliefs would be related to both their use of behaviour management and instructional practices. Teachers' Total Beliefs about ADHD were weakly correlated with their self-reported use of behaviour management practices in the classroom. While this correlation was significant, it was smaller than had been initially anticipated. It was also anticipated that teachers' beliefs would correlate with their use of instructional strategies, but these two factors were not found to be related.

There are a number of possible explanations for these findings. One explanation could be that the beliefs examined in the study were not closely enough related to the behaviours that were being examined to find large, significant relationships between them. Recall from earlier in this paper the Theory of Planned Behaviour, which explains that an individual's beliefs about a specific behaviour (e.g., the expected outcome of the behaviour) will directly relate to the individual's performance of that behaviour. In the case of the present study, the beliefs examined were related to ADHD and subsequently were not highly related to the behaviours being measured (i.e., teachers' practices in the classroom). Perhaps larger, more significant correlations would have been found if teachers' specific beliefs about the instructional strategies and behaviour management practices being measured were examined, instead of the more broadly related beliefs about ADHD.

It was also anticipated that teachers' knowledge of ADHD would be positively related to teachers' self-reported use of instructional strategies and behaviour

management practices in the classroom; however, no significant correlations were found between the total or subscale scores of the knowledge questionnaire and either the instructional approaches or behaviour management subscales. One explanation for these findings could be that the questionnaire used to measure teachers' knowledge of ADHD was not tapping into the kind of ADHD knowledge that would relate to teachers' classroom practices. Another possibility could be that, like the Theory of Planned Behaviour would predict regarding beliefs, it is specific knowledge of the classroom practices being measured that would be related to the use of these strategies. A further explanation could be that the findings are correct and teachers' knowledge of ADHD does not relate to their use of behaviour management and instructional practices in the classroom.

If the latter explanation is correct and teachers' knowledge of ADHD does not impact on their use of effective classroom practices, then this has considerable implications for the content of teacher training in ADHD. Most of the time, the focus of professional development sessions in ADHD is on learning general facts about ADHD, yet it appears that these are not related to teachers' practices. School boards and individuals responsible for creating and implementing teacher training should be cognizant of this when selecting and designing training sessions for teachers. If the goal of teacher training in ADHD is to improve teachers' skills in teaching these students, then perhaps it would be beneficial to focus training on increasing knowledge of effective evidence-based strategies.

Demographics, Knowledge, Beliefs, and Instructional and Behaviour Management Practices

A few demographic factors were found to relate to teachers' knowledge and beliefs regarding ADHD. While not all of these relationships were anticipated given the previous research, they nevertheless appear logical. It was expected that teachers' experience working with students with ADHD and training in ADHD would be positively correlated with knowledge of ADHD; however, these relationships were not found in the current study. As anticipated, length of teaching experience was not correlated with either knowledge of or beliefs about ADHD. As predicted, professional development training in ADHD was related teachers' beliefs about ADHD. While not anticipated, teachers' level of education was correlated with both teachers' knowledge and beliefs regarding ADHD. Furthermore, another unanticipated correlation existed between the number of courses teachers had taken in special education/exceptional learners and teachers beliefs about ADHD.

With regard to the impact of demographic factors on teachers' practices in the classroom, results from the current study were consistent with those of previous research (Martinussen, et al., 2011). As anticipated, teacher training in ADHD was related to teachers' practices in the classroom. Additionally, courses taken in special education/exceptional learners were significantly related to both teachers use of instructional strategies and behaviour management practices.

In summary, it appears that certain demographic factors are relevant in regard to teachers' knowledge, beliefs regarding ADHD and their use of classroom strategies that have been shown to be effective in managing students with ADHD. More specifically,

professional development training in ADHD and special education/exceptional learners, amount learned about ADHD during teacher training, and a teachers' level of education all appear to be related to one or more of these factors.

Implications

Findings from the current study offer a snap shot into the classrooms of Nova Scotia, providing insight into teachers' knowledge, beliefs and use of empirically based teaching methods. Researchers in Canada have only begun to investigate the possible factors that may contribute to teachers' use of best practices in their classroom, and findings from this study add to this body of knowledge. Furthermore, findings from this study provide valuable details about Nova Scotian teachers' knowledge and beliefs regarding ADHD, an area of research that is largely unknown.

Additionally, findings from this study have important implications for the content of teacher training programs in ADHD. An underlying assumption of these programs may be that providing teachers with knowledge of ADHD will change their practices in the classroom. However, findings from this study indicate that teachers' knowledge of ADHD may not be related to what teachers are doing in the classroom to help these students. As theory suggests, it could be that teachers' beliefs about instructional modifications and behaviour management practices are impacting their use of these practices. Therefore, the focus on teacher training in ADHD could be on changing teachers' beliefs relating to these behaviours, or perhaps even more importantly training could center on teaching teachers how to properly implement and use these evidence-based practices.

Strengths and Limitations

The present study has provided detailed and current descriptions of teacher factors relating to ADHD for a substantial sample of teachers in Nova Scotia. The practical nature of this study has also provided numerous real-world implications, which may eventually lead to better quality of education and instruction for students with ADHD.

A number of limitations of the current study were also identified. Teachers in the present study taught in mostly rural settings and findings of the current study may not generalize to the rest of Canada, or even to more urban areas of Nova Scotia. Further limitations of the present study include the use of knowledge and beliefs questionnaires that were only broadly related to the behaviours that were measured. Another methodological limitation of the study is that we were relying on teachers' self-reported use of classroom management practices as opposed to having an observer rate the teachers' behaviours. However, Clunies-Ross, Little, and Kienhuis (2008) found that teachers' self-reports of classroom management strategies accurately reflected their actual practice. Additional limitations stem from the fact that there are likely other factors impacting teachers' use of effective instructional and behavioural strategies in classroom. These could include teachers' knowledge of effective classroom practices; school factors, such as administration and support; and classroom factors, such as number of students in a class and the unique qualities of students in class.

Future Research

Since knowledge and beliefs regarding ADHD were not significant contributors to teachers' classroom practices, future research could examine other possible factors that may be at play. This could include examining the relationship between teachers'

knowledge and beliefs regarding evidence-based practices to see if they relate to teachers' practices in the classroom. Perhaps increased knowledge of specific instructional approaches and behaviour management strategies and how to implement these practices would result in improved teacher practices in the classroom.

Based on findings from this study and the Theory of Planned Behaviour discussed above, a number of different questions can be formulated. First, teachers in the present study did not believe that they had the skills and ability to effectively manage students with ADHD. From this, it would be interesting to investigate whether teachers possess sufficient knowledge of evidence-based classroom practices. Further, beyond theoretical or book knowledge, do teachers have the practical knowledge of these strategies and would they know how to implement them effectively?

As per the Theory of Planned Behaviour, teachers' behaviour should be influenced by their beliefs about whether the outcome of the behaviour will be favorable. Therefore, it would be interesting to investigate whether teachers believe that these strategies and approaches would be helpful when teaching children with ADHD, learning disabilities, behaviour problems, etc.? Further, do teachers believe that these strategies will be too difficult to do, and do they feel like their efforts will pay off? Additionally, the Theory of Planned Behaviour explains that an individual's assessment about whether they believe important people in their life want them to do a given behaviour, will also help determine whether, or not, they do a behaviour. Consequently, it may be useful to determine whether teachers believe their school administration would want them to use these strategies and approaches.

Conclusion

In summary, teachers from the Nova Scotia school boards in this study had knowledge of ADHD that was comparable to that of teachers' knowledge as assessed in the previous studies in the US and Australia. Teachers had the most knowledge of the diagnosis and symptoms of ADHD, and held the most favorable beliefs about the diagnostic legitimacy of ADHD. There were some areas of knowledge in which teachers were lacking and some beliefs that teachers held that were concerning. Teachers were wanting in their understanding of the treatments for ADHD and did not believe that they had the skills and abilities to effectively manage students with ADHD. These findings have important implications for school psychologists and teacher-trainers who may wish to attempt improve these beliefs and address these gaps in knowledge. Furthermore, results of this study indicated that broad knowledge of ADHD might not be related to teachers' use of classroom practices that have found to be of effective for students with ADHD. While current teacher training programs in ADHD may focus on increasing teachers' knowledge of ADHD, it may be more helpful for these programs to focus on teachers' knowledge and beliefs relating to evidence-based classroom practices that have been found to be effective in teaching students, not only with ADHD, but also with learning disabilities and other behaviour and attention disorders.

References

- Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. doi:10.1016/0749-5978(91)90020-T
- Ajzen, I. (2006). Theory of planned behavior. *University of Massachusetts*. Retrieved from <http://people.umass.edu/aizen/tpb.diag.html>
- Akram, G., Thomson, A. H., Boyter, A. C., & McLarty, M. (2009). ADHD and the role of medication: Knowledge and perceptions of qualified and student teachers. *European Journal of Special Needs Education*, 24(4), 423-436. doi:10.1080/08856250903223088
- American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (4th ed., text rev). Washington, DC: Author.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, 40(4), 471-499. doi:10.1348/014466601164939
- Barnard-Brak, L., Sulak, T. N., & Fearon, D. D. (2011). Coexisting disorders and academic achievement among children with ADHD. *Journal of Attention Disorders*, 15(6), 506-515. doi:10.1177/1087054710369667
- Bekle, B. (2004). Knowledge and attitudes about Attention-Deficit Hyperactivity Disorder (ADHD): A comparison between practicing teachers and undergraduate education students. *Journal of Attention Disorders*, 7(3), 151-161. doi:10.1177/108705470400700303
- Chaban, P., & Tannock, R. (2009). Teachers' role in the diagnosis of ADHD. *About Kids*

Health: Trusted Answers from The Hospital for Sick Children. Retrieved from <http://www.aboutkidshealth.ca/en/resourcecentres/adhd/diagnosis/makingthediagnosisofadhd/pages/theteacher'sroleindiagnosis.aspx>

Chronis, A. M., Jones, H. A., & Raggi, V. L. (2006). Evidence-based psychosocial treatments for children and adolescents with attention-deficit/hyperactivity disorder. *Clinical Psychology Review, 26*(4), 486-502.

doi:10.1016/j.cpr.2006.01.002

Corkum, P., Panton, R., Ironside, S., MacPherson, M., & Williams, T. (2008). Acute impact of immediate release methylphenidate administered three times a day on sleep in children with attention-deficit/hyperactivity disorder. *Journal of Pediatric Psychology, 33*(4), 368-379. doi:10.1093/jpepsy/jsm106

Daley, D. D., & Birchwood, J. J. (2010). ADHD and academic performance: Why does ADHD impact on academic performance and what can be done to support ADHD children in the classroom? *Child: Care, Health and Development, 36*(4), 455-464. doi:10.1111/j.1365-2214.2009.01046.x

Daly, B. P., Creed, T., Xanthopoulos, M., & Brown, R. T. (2007). Psychosocial treatments for children with attention deficit/hyperactivity disorder. *Neuropsychology review, 17*(1):73-89. DOI: 10.1007/s11065-006-9018-2

Diamantopoulou, S., Rydell, A., Thorell, L. B., & Bohlin, G. (2007). Impact of executive functioning and symptoms of attention deficit hyperactivity disorder on children's peer relations and school performance. *Developmental Neuropsychology, 32*(1), 521-542.

DuPaul, G. J. (2007). School-based interventions for students with attention deficit

hyperactivity disorder: Current status and future directions. *School Psychology Review*, 36(2), 183-194.

DuPaul, G.J., Weyandt, L. L., & Janusis, G. M. (2011). ADHD in the classroom: Effective intervention strategies. *Theory Into Practice* 50(1), 35-42.
doi:10.1080/00405841.2011.534935

Eiraldi, R. B., Mautone, J. A., & Power, T. J. (2012). Strategies for implementing evidence-based psychosocial interventions for children with attention-deficit/hyperactivity disorder. *Child and Adolescent Psychiatric Clinics of North America*, 21(1), 145-159. doi:10.1016/j.chc.2011.08.012

Fabiano, G. A., Pelham, W. r., Coles, E. K., Gnagy, E. M., Chronis-Tuscano, A., & O'Connor, B. C. (2009). A meta-analysis of behavioral treatments for attention-deficit/hyperactivity disorder. *Clinical Psychology Review*, 29(2), 129-140.
doi:10.1016/j.cpr.2008.11.001

Findling, R. L. (2008). Evolution of the treatment of attention-deficit/hyperactivity disorder in children: A review. *Clinical Therapeutics: The International Peer-Reviewed Journal of Drug Therapy*, 30(5), 942-957.
doi:10.1016/j.clinthera.2008.05.006

Galéra, C. C., Melchior, M. M., Chastang, J. F., Bouvard, M. P., & Fombonne, E. E. (2009). Childhood and adolescent hyperactivity-inattention symptoms and academic achievement 8 years later: The GAZEL Youth study. *Psychological Medicine*, 39(11), 1895-1906. doi:10.1017/S0033291709005510

Jensen, P. S., Arnold, L., Swanson, J. M., Vitiello, B., Abikoff, H. B., Greenhill, L. L., & ... Hur, K. (2007). 3-year follow-up of the NIMH MTA study. *Journal Of The*

American Academy of Child & Adolescent Psychiatry, 46(8), 989-1002.

doi:10.1097/CHI.0b013e3180686d48

Jitendra, A. K., DuPaul, G. J., Someki, F., & Tresco, K. E. (2008). Enhancing academic achievement for children with attention-deficit hyperactivity disorder: Evidence from school-based intervention research. *Developmental Disabilities Research Reviews, 14*(4), 325-330. doi:10.1002/ddrr.39

Jones, H. A., & Chronis-Tuscano, A. (2008). Efficacy of teacher in-service training for attention-deficit/hyperactivity disorder. *Psychology in the Schools, 45*(10), 918-929. doi:10.1002/pits.20342

Kos, J. (2008, September). What do teachers know, think and intend to do about ADHD? *Teaching and Learning and Leadership*. Paper presented at the European Conference on Educational Research, Göteborg, Sweden.
http://research.acer.edu.au/tll_misc/9

Kos, J. M., Richdale, A. L., & Jackson, M. S. (2004). Knowledge about Attention-Deficit/Hyperactivity Disorder: A Comparison of in-service and preservice teachers. *Psychology in the Schools, 41*(5), 517-526. doi:10.1002/pits.10178

Langberg, J. M., Molina, B. G., Arnold, L., Epstein, J. N., Altaye, M., Hinshaw, S. P., & Hechtman, L. (2011). Patterns and predictors of adolescent academic achievement and performance in a sample of children with attention-deficit/hyperactivity disorder. *Journal of Clinical Child and Adolescent Psychology, 40*(4), 519-531. doi:10.1080/15374416.2011.581620

Loe, I. M., & Feldman, H. M. (2007). Academic and educational outcomes of children with ADHD. *Journal of Pediatric Psychology, 32*(6), 643-654.

doi:10.1093/jpepsy/jsl054

- Manstead, A. R. (2011). The benefits of a critical stance: A reflection on past papers on the theories of reasoned action and planned behaviour. *British Journal of Social Psychology*, 50(3), 366-373. doi:10.1111/j.2044-8309.2011.02043.x
- Martinussen, R., Tannock, R., & Chaban, P. (2011). Teachers' reported use of instructional and behavior management practices for students with behavior problems: Relationship to role and level of training in ADHD. *Child & Youth Care Forum*, 40(3), 193-210. doi:10.1007/s10566-010-9130-6
- McConaughy, S. H., Volpe, R. J., Antshel, K. M., Gordon, M., & Eiraldi, R. B. (2011). Academic and social impairments of elementary school children with attention deficit hyperactivity disorder. *School Psychology Review*, 40(2), 200-225.
- Ohan, J. L., Cormier, N., Hepp, S. L., Visser, T. A. W., & Strain, M. C. (2008). Does knowledge about attention-deficit/hyperactivity disorder impact teachers' reported behaviors and perceptions? *School Psychology Quarterly*, 23(3), 436-449. doi:10.1037/1045-3830.23.3.436
- Ohan, J. L., Visser, T. A. W., Strain, M. C., & Allen, L. (2011). Teachers' and education students' perceptions of and reactions to children with and without the diagnostic label "ADHD". *Journal of School Psychology*, 49(1), 81-105. doi:10.1016/j.jsp.2010.10.001
- Pelham, W. Jr., & Gnagy, E. M. (1999). Psychosocial and combined treatments for ADHD. *Mental Retardation and Developmental Disabilities Research Reviews*, 5(3), 225-236. doi:10.1002/(SICI)1098-2779(1999)5:3<225::AID-MRDD9>3.0.CO;2-E

- Raggi, V. L., & Chronis, A. M. (2006). Interventions to Address the Academic Impairment of Children and Adolescents with ADHD. *Clinical Child and Family Psychology Review*, 9(2), 85-111. doi:10.1007/s10567-006-0006-0
- Reiber, C., & McLaughlin, T. F. (2004). Classroom interventions: Methods to improve academic performance and classroom behavior for students with attention-deficit/hyperactivity disorder. *International Journal of Special Education*, 19(1), 1-13.
- Rodriguez, A., Jaervelin, M. R., Obel, C., Taanila, A., Miettunen, J., Moilanen, I., Henriksen, T. B., Pietilaenen, K., Ebeling, H., Kotimaa, A. J., Linnet, K. M. & Olsen, J. (2007). Do inattention and hyperactivity symptoms equal scholastic impairment? Evidence from three European cohorts. *BMC Public Health*, 7, 327.
- Schultz, B. K., Storer, J., Watabe, Y., Sadler, J., & Evans, S. W. (2011). School-based treatment of attention-deficit/hyperactivity disorder. *Psychology in the Schools*, 48(3), 254-262. doi:10.1002/pits.20553
- Sciutto, M. J., Terjesen, M. D., & Bender Frank, A. S. (2000). Teachers' knowledge and misperceptions of Attention-Deficit/Hyperactivity Disorder. *Psychology in the Schools*, 37(2), 115-122. doi:10.1002/(SICI)1520-6807(200003)37:2<115::AID-PITS3>3.0.CO;2-5
- Snider, V. E., Busch, T., & Arrowood, L. (2003). Teacher knowledge of stimulant medication and ADHD. *Remedial and Special Education*, 24(1), 47-57. doi:10.1177/074193250302400105
- Trout, A. L., Lienemann, T., Reid, R., & Epstein, M. H. (2007). A review of non-medication interventions to improve to academic performance of children and

youth with ADHD. *Remedial and Special Education*, 28(4), 207-226.

doi:10.1177/07419325070280040201

Vereb, R. L., & DiPerna, J. C. (2004). Research brief: Teachers' knowledge of ADHD, treatments for ADHD, and treatment acceptability: An initial investigation.

School Psychology Review, 33(3), 421-428.

West, J., Taylor, M., Houghton, S., & Hudyma, S. (2005). A comparison of teachers' and parents' knowledge and beliefs about attention-Deficit/Hyperactivity disorder (ADHD). *School Psychology International*, 26(2), 192-208.

doi:10.1177/0143034305052913

Weyandt, L. L., Fulton, K. M., Schepman, S. B., Verdi, G. R., & Wilson, K. G. (2009).

Assessment of teacher and school psychologist knowledge of attention-deficit/hyperactivity disorder. *Psychology in the Schools*, 46(10), 951-961.

doi:10.1002/pits.20436

White, S. W., Sukhodolsky, D. G., Rains, A. L., Foster, D., McGuire, J. F., & Scahill, L.

(2011). Elementary school teachers' knowledge of Tourette syndrome, Obsessive-Compulsive Disorder, & Attention Deficit/Hyperactivity Disorder: Effects of teacher training. *Journal of Developmental and Physical Disabilities*, 23(1), 5-14.

doi:10.1007/s10882-010-9209-x

Table 1

Demographic Statistics

Gender		
Female	99	87.6
Male	13	11.5
Missing	1	.9
Highest Level of Education		
Bachelors	66	58.4
Master	37	32.7
PhD	1	0.9
Other	7	6.2
Missing	2	1.8
Type of Teacher		
Full-time	91	80.5
Part-time	15	13.3
Resource/ Support	11	9.7
Learning Centre	5	4.4
Supply	2	1.8
Other	10	8.8
Teaching Experience		
Elementary	113	100
Junior High	76	67.3
Senior High	46	40.7
Amount Learned about ADHD in Teacher Training		
Nothing	15	13.3
Very Little	40	35.4
Some	50	44.2
A lot	7	6.2
Missing	1	.9
Teachers' Perceived Knowledge of ADHD		
Unknowledgeable	1	.9
Not very knowledgeable	7	6.2
A little bit knowledgeable	37	30.1
Moderately knowledgeable	60	53.1
Very knowledgeable	10	8.8
Teachers Reporting that they Received Support	92	81.4
Source of Support for Dealing with Students with ADHD		
Other teachers	52	46.0
School system	24	21.2
Parents	16	14.2
Clinical Psychologists	9	8.0
School Psychologists	29	25.7

Table 2

Additional Demographic Statistics

Teacher Factor	<i>M</i>	<i>SD</i>	Minimum Score	Maximum Score
Teacher age (years)	42.46	9.34	24	58
Length of teaching (years)	15.48	8.99	0.42	35.00
Number of children with ADHD taught	21.26	24.16	1.00	200.00
Courses in Special Education/ Exceptional Learners	2.70	3.70	0	22.00
Professional development in Special Education/Exceptional Learners (hours)	29.76	58.66	0	300.00
Professional development in ADHD (hours)	7.21	11.08	0	50.00

Table 3

Means and Standard Deviations for Subscale and Total Knowledge Scores on the KADDS

Knowledge	Mean	<i>SD</i>	Minimum Score	Maximum Score
Total	68.22	11.86	25.71	91.43
General	61.00	14.70	21.43	92.86
Symptoms/Diagnosis	79.98	13.10	37.50	100.00
Treatment	68.75	16.65	15.38	100.00

Note. KADDS = Knowledge of Attention Deficit Disorders Scale (Sciutto, Terjesen, & Frank, 2000). Mean, minimum, and maximum scores are expressed as a percentage correct.

Table 4

Percentage of Correct and Incorrect Answers for Individual Items of the KADDS

Subscale	Items	True/ False	Percent Correct	Percent Incorrect
General Knowledge	1. Most estimates suggest that ADHD occurs in approximately 15% of school aged children.	F	30.1	67.3
	4. Children with ADHD are typically more compliant with their fathers than with their mothers.	T	19.5	69.0
	6. ADHD is more common in the 1st degree biological relative (i.e. mother, father) of children with ADHD than in the general population.	T	61.1	28.3
	13. It is possible for an adult to be diagnosed with ADHD.	T	99.1	.9
	17. Symptoms of depression are found more frequently in children with ADHD than in non-ADHD children.	T	75.2	13.3
	19. Most children with ADHD outgrow their symptoms by the onset of puberty and subsequently function normally in adulthood.	F	80.5	13.3
	22. If a child with ADHD is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework.	F	95.6	3.5
	24. A diagnosis of ADHD by itself makes a child eligible for certain educational interventions.	F	56.6	40.7
	28. There are specific diagnostic tests which can be given by medical doctors (e.g. pediatrician) to make a	F	37.2	53.1

Symptom/ Diagnosis	definitive diagnosis of ADHD.			
	29. In school age children, the prevalence of ADHD in males and females is equivalent.	F	89.4	4.4
	30. In very young children (less than 4 years old), the symptoms of children with ADHD are distinctly different from school-aged children with ADHD.	F	51.3	29.2
	31. It is more obvious that a child has ADHD in a classroom setting, than in a free play setting.	T	62.8	28.3
	32. The majority of children with ADHD evidence some degree of poor school performance in the elementary school years.	T	82.3	14.2
	33. Children who are adopted or live in foster care have a higher likelihood of being diagnosed with ADHD.	T	13.3	74.3
	3. Children with ADHD are frequently distracted by extraneous stimuli.	T	91.2	6.2
	5. In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7.	T	23.0	73.5
	7. One symptom of children with ADHD is that they have been physically cruel to other people.	F	85.8	9.7
	9. Children with ADHD often fidget or squirm in their seats.	T	94.7	3.5
	14. Children with ADHD often have a history of stealing or destroying other peoples' things.	F	70.8	23.9

Treatment	16. Current wisdom about ADHD suggests two clusters of symptoms. One of inattention and the other consisting of hyperactivity and impulsivity.	T	92.9	4.4
	21. In order to be diagnosed with ADHD, a child must exhibit relevant symptoms in two or more settings (e.g. home and school).	T	86.7	8.0
	26. Children with ADHD often have difficulties organizing tasks and activities.	T	94.7	2.7
	2. Current research suggests that ADHD is largely the result of ineffective parenting skills.	F	96.5	1.8
	8. Antidepressant drugs have been effective in reducing symptoms for some children with ADHD.	T	47.8	35.4
	10. Parent and teacher training in managing a child with ADHD are generally effective when combined with medication treatment.	T	85.0	8.8
	11. It is common for children with ADHD to have grandiosity.	F	54.9	28.3
	12. When treatment of a child with ADHD is terminated, it is rare for the child's symptoms to return.	F	95.6	.9
	15. Side effects of stimulant drugs (e.g. Ritalin) used for treatment of ADHD may include mild insomnia and appetite reduction.	T	98.2	0
	18. Individual psychotherapy is usually sufficient for the treatment of most children with ADHD.	F	67.3	17.7
	20. In severe cases of	T	58.4	35.4

	ADHD, medication is often used before other behaviour modification techniques are attempted.			
	23. Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.	F	40.7	53.1
	25. Stimulant drugs are the most common type of drug used to treat children with ADHD.	T	54.0	26.5
	34. Behavioural/Psychological interventions without medication have been found to be an effective treatment for severe cases of ADHD.	F	42.5	38.1
	35. Chiropractics has been proven to be an effective treatment for severe cases of ADHD.	F	57.5	14.2
	36. Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD.	F	95.6	.9
Item removed from Total and subscale score	*27. Children with ADHD generally experience more problems in unfamiliar situations (e.g., concert at school) than in familiar situations (e.g., regular classroom).	T	28.3	66.4

Note. KADDS = Knowledge of Attention Deficit Disorders Scale (Sciutto, Terjesen, & Frank, 2000).

* Item was removed during scoring and was not included in subscale or total scores.

Table 5

Correlations between Teachers' Perceived Knowledge and Actual Knowledge scores of the KADDS

	Total Knowledge		General Knowledge		Symptoms/ Diagnosis Knowledge		Treatment Knowledge	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Perceived Knowledge of ADHD	.120	.207	.045	.637	-.043	.651	.209*	.027

Note. KADDS = Knowledge of Attention Deficit Disorders Scale (Sciutto, Terjesen, & Frank, 2000).

* $p < .05$

Table 6

Means and Standard Deviations for Subscale and Total Scores of the B-ADHD

Beliefs	<i>M</i>	<i>SD</i>	Minimum Score	Maximum Score
Total	2.54	.30	1.73	3.39
Lack of Control	2.17	.46	1.20	3.50
Negative Classroom Effects	2.70	.78	1.00	4.60
Diagnostic Validity	1.79	.60	1.00	4.25
Perceived Competence	2.82	.74	1.00	4.67
Influences to Management	3.11	.66	1.67	4.67
Expectations	2.44	.61	1.00	4.00
External Control	3.26	.53	2.00	4.67

Note. B-ADHD = Beliefs about Attention Deficit Hyperactivity Disorder (Kos, 2008). The majority of items in the Beliefs questionnaire were negative statements. Teachers responded to each statement by selecting one of the following options: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, or 5 = Strongly Agree. Positive statements were reverse coded during scoring. Higher scores therefore indicate more negative beliefs.

Table 7

Means and Standard Deviations for Individual Items of the B-ADHD

Subscale	Item	<i>M</i>	<i>SD</i>	Minimum Score	Maximum Score
Lack of Control	18. Students with ADHD could control their behaviour if they really wanted to.	1.67	.73	1.00	4.00
	23. Students with ADHD misbehave because they don't like following rules.	1.72	.63	1.00	4.00
	21. Students with ADHD could do better in only they'd try harder.	2.04	.78	1.00	4.00
	17. You cannot expect as much from a student with ADHD as you can from other students.	1.83	.68	1.00	5.00
	*25. Managing the behaviour of students with ADHD is easy.	2.03	.65	2.00	5.00
	14. Students with ADHD should not be taught in the regular classroom.	1.79	.84	1.00	5.00
Negative Classroom Effects	15. The extra time teachers spend with students with ADHD is at the expense of students without ADHD.	3.16	1.11	1.00	5.00
	16. Other students don't learn as well as they should when there is a student with ADHD in the classroom.	2.68	1.08	1.00	5.00

Diagnostic Validity	8. Having a student with ADHD in my class would disrupt my teaching.	3.22	1.00	1.00	5.00
	11. Students with ADHD should be taught by specialist teachers, not classroom teachers.	1.87	.80	1.00	5.00
	9. I would feel frustrated having to teach a student with ADHD.	2.59	1.09	1.00	5.00
	*1. ADHD is a valid diagnosis.	4.44	1.00	1.00	5.00
	2. ADHD is an excuse for students to misbehave.	1.54	.83	1.00	5.00
	*7. ADHD results in a legitimate educational problem.	4.05	1.09	1.00	5.00
	4. ADHD is a behaviour disorder that should "not" be treated with medication.	2.11	.82	1.00	5.00
Perceived Competence	*26. I have the skills to deal with students with ADHD in my class.	3.22	.86	1.00	5.00
	*27. I have the ability to effectively manage students with ADHD.	3.27	.82	1.00	5.00
	28. I am limited in the way I manage a student with ADHD.	2.96	.99	1.00	5.00
Influence to Management					
	30. Other staff members influence how I would manage a child with ADHD.	2.76	1.03	1.00	5.00
	31. Parents of students	3.23	.90	1.00	5.00

	with ADHD influence how I would manage a student with ADHD.				
	*24. Students with ADHD are just as difficult to manage in the classroom as any other student.	2.63	.95	1.00	5.00
Expectations	10. Young students with ADHD should be treated more leniently than older students with ADHD.	2.23	.90	1.00	5.00
	17. You cannot expect as much from a student with ADHD as you can from other students.	1.83	.68	1.00	5.00
	6. Medications such as Ritalin and Dexamphetamine should only be used as a last resort.	3.27	1.11	1.00	5.00
External Control	*5. All children with ADHD should take medication.	1.9	.79	1.00	5.00
	29. My school has policies that regulate how teachers manage a student with ADHD.	2.55	.92	1.00	5.00
	22. Students with ADHD have little control over the way they behave.	3.11	.93	1.00	5.00
Not included in subscales	3. ADHD is diagnosed too often.	2.98	1.17	1.00	5.00
	12. I would prefer to teach a student who is over-active more than a student who is inattentive.	2.80	.85	1.00	5.00
	13. Most students with ADHD don't really disrupt class that	2.50	1.00	1.00	4.00

much.

19. Students with ADHD misbehave because they are	1.38	.54	1.00	3.00
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naughty.

20. Students with ADHD cannot change the way they behave.	2.30	.99	1.00	3.00
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Note. B-ADHD = Beliefs about Attention Deficit Hyperactivity Disorder (Kos, 2008). The majority of items in the Beliefs questionnaire are negative statements. Teachers responded to each statement by selecting one of the following options: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, or 5 = Strongly Agree. Higher scores on negative statements therefore indicate more negative beliefs.

* Item was reverse coded for scoring. It is presented here in its original form.

Table 8

Means and Standard Deviations for Subscale Scores of the IBMAS

IBMAS Subscales	<i>M</i>	<i>SD</i>	Minimum Score	Maximum Score
Behavior Management	3.44	.44	2.21	4.42
Instructional Strategies	3.41	.54	1.84	4.68

Note. IBMAS = Instructional and Behaviour Management Approaches Survey (Martinussen, Tannock, & Chaban, 2011). Teachers responded to each item in the subscale by selecting the frequency with which they used a given strategy as represented by one of the following: 1 = Rarely, 2 = Seldom, 3 = Occasionally, 4 = Frequently, and 5 = Most of the time.

Table 9

Means and Standard Deviations for Individual Items of the IBMAS

Subscale	Item	<i>M</i>	<i>SD</i>	Minimum Score	Maximum Score
Instructional Approaches	3. Modifying language used for instruction (e.g., speaking slowly, shortening sentences, repeating instructions)	4.12	.76	1.00	5.00
	6. Providing concrete cues and supports (e.g., visual cues/ posters, diagrams)	3.96	.85	1.00	5.00
	7. Shortening assignments	3.65	.92	1.00	5.00
	11. Chunking assignments into smaller sections	3.85	.87	1.00	5.00
	12. Giving student a choice in academic tasks and/or assignments	3.36	.91	1.00	5.00
	13. Providing student with more immediate and frequent feedback about performance on assignments or activities	3.83	.66	2.00	5.00
	14. Providing student with explicit strategy instruction (e.g. study skills, learning strategies, how to take notes)	3.79	.89	1.00	5.00
	18. Simplifying instructions and giving them in a step by step manner	4.12	.72	2.00	5.00
	19. Providing student with a peer tutor or study partner	3.35	1.03	1.00	5.00
	20. Helping the student set goals and monitor progress	3.28	.95	1.00	5.00

	24. Providing advance organizers for content	3.02	1.09	1.00	5.00
	26. Teaching student how to organize or plan	3.54	.86	1.00	5.00
	30. Providing written directions as well as oral directions	3.59	1.12	1.00	5.00
	31. Using choral response techniques (e.g., response cards)	2.08	1.03	1.00	5.00
	34. Providing student with guided notes for content	2.62	1.04	1.00	5.00
	35. Adjusting materials for student (e.g., adding color, more structure)	2.99	1.00	1.00	5.00
	37. Highlighting key points in lesson for student	3.45	.92	1.00	5.00
	38. Providing student with alternative formats in which tests or assignments are completed	3.30	1.06	1.00	5.00
	39. Teaching student how to use an assignment notebook	2.90	1.16	1.00	5.00
Behaviour Management	1. Preferential seating assignment (e.g., sitting near the front of the room)	4.32	.67	3.00	5.00
	*2. Verbal reprimands	3.19	.89	1.00	5.00
	4. Providing assistance during transitions	4.04	.87	1.00	5.00
	5. Using nonverbal cues (e.g., hand movement) to remind student to refocus student on task	4.13	.69	2.00	5.00
	8. Daily Report Card - Home/School	2.80	1.21	1.00	5.00
	9. Providing consequences for misbehavior (e.g., remove a privilege)	3.40	.96	1.00	5.00

10. Creating a behavioral contract	3.05	1.18	1.00	5.00
15. Selective ignoring (ignoring certain behaviors)	3.60	.91	1.00	5.00
16. Self-management system (training students to self-monitor and evaluate their own behavior)	3.18	1.03	1.00	5.00
17. Implementing positive behavioral support plans	3.82	.98	1.00	5.00
21. Functional behavioral assessment (identifying problem behaviors, identifying actions that precede or follow the behavior, identifying frequency and severity of behavior, and then using this information to develop an intervention plan)	3.05	1.11	1.00	5.00
22. Proximity control (moving close to the student)	4.07	.75	2.00	5.00
23. Token economy (give tokens for appropriate behavior and remove tokens for inappropriate behavior)	2.54	1.35	1.00	5.00
27. Providing rewards or incentives	3.65	.89	1.00	5.00
28. Providing positive teacher attention (praise, encouragement)	4.41	.62	3.00	5.00
32. Teaching appropriate behavior (e.g., social skills) and rehearsing it with the student	3.27	1.01	1.00	5.00
33. Frequent communication with parents (e.g., conferences, phone calls)	3.80	.83	1.00	5.00

	*36. Time out	2.77	1.10	1.00	5.00
	40. Response cost behavior management (points or tokens are earned for specific appropriate behavior and deducted for specific inappropriate behaviors)	2.20	1.20	1.00	5.00
Not part of subscales	25. Lowering expectations for work	2.50	1.04	1.00	5.00
	29. Removing student from the classroom for misbehavior	2.93	1.05	1.00	5.00

Note. IBMAS = Instructional and Behaviour Management Approaches Survey (IBMAS; Martinussen, Tannock, & Chaban, 2011). Teachers responded to each item in the subscale by selecting the frequency with which they used a given strategy as represented by one of the following: 1 = Rarely, 2 = Seldom, 3 = Occasionally, 4 = Frequently, and 5 = Most of the time.

*Item was reverse coded for scoring. It is presented here in its original form.

Table 10

Correlations between Total and Subscale Scores of the KADDS and Subscale Scores of the IBMAS

Knowledge	Instructional Approaches		Behaviour Management	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Total	-.04	.707	-.13	.171
General	-.03	.734	-.09	.367
Symptoms/Diagnosis	-.01	.939	-.01	.960
Treatment	-.03	.717	-.17	.080

Table 11

Correlations between Total and Subscale Scores of the B-ADHD and Subscale Scores of the IBMAS

Beliefs	Instructional Approaches		Behaviour Management	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Total	-.16	.096	-.22	.020*
Lack of Control	-.02	.854	-.18	.058
Negative Classroom Effects	-.12	.226	-.03	.752
Diagnostic Validity	-.12	.218	-.18	.062
Perceived Competence	-.12	.062	-.05	.616
Influences to Management	-.12	.226	-.04	.643
Expectations	-.10	.280	-.19	.046*
External Control	.08	.399	-.04	.686

Note. B-ADHD = Beliefs about Attention Deficit Hyperactivity Disorder (Kos, 2008). IBMAS = Instructional and Behaviour Management Approaches Survey (IBMAS; Martinussen, Tannock, & Chaban, 2011).

* $p < .05$

Table 12

Correlations between Total and Subscale Scores of the KADDS and Total and Subscale Scores of the B-ADHD

Beliefs	Knowledge			
	Total	General	Symptoms/ Diagnosis	Treatment
Total	$r = -.07$ (.468)	$r = -.03$ (.774)	$r = -.09$ (.345)	$r = -.06$ (.508)
Lack of Control	$r = -.07$ (.487)	$r = -.00$ (.991)	$r = -.15$ (.110)	$r = -.05$ (.580)
Negative Classroom Effects	$r = .09$ (.366)	$r = .15$ (.115)	$r = .01$ (.903)	$r = .02$ (.853)
Diagnostic Validity	$r = -.24^*$ (.010)	$r = -.16$ (.091)	$r = -.23^*$ (.015)	$r = -.20^*$ (.032)
Perceived Competence	$r = .07$ (.483)	$r = .06$ (.508)	$r = .13$ (.188)	$r = .01$ (.932)
Influences to Management	$r = .06$ (.527)	$r = .02$ (.843)	$r = .07$ (.469)	$r = .07$ (.498)
Expectations	$r = -.12$ (.196)	$r = -.10$ (.302)	$r = -.20^*$ (.030)	$r = -.04$ (.653)
External Control	$r = -.01$ (.922)	$r = -.14$ (.139)	$r = .13$ (.178)	$r = .05$ (.575)

Note. IBMAS = Instructional and Behaviour Management Approaches Survey (IBMAS; Martinussen, Tannock, & Chaban, 2011). Values in brackets are p values.

* $p < .05$

Table 13

Correlations Between Demographic Factors and Total Scores of the KADDS and the B-ADHD

Variables	Total Knowledge		Total Beliefs	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Age	.08	.407	-.11	.284
Gender	.05	.620	-.11	.248
Length of Teaching	-.02	.845	-.07	.454
Highest Level of Education	.23	.016*	-.26	.006*
Children with ADHD taught	.03	.738	-.16	.095
Amount Learned about ADHD in Teacher Training	-.16	.102	.03	.769
Professional development in Special Education/ Exceptional Learners (hours)	.08	.397	-.128	.182
Courses in Special Education/Exceptional Learners	.15	.115	-.24	.011*
Professional development in ADHD (hours)	.11	.260	-.25	.007*

* $p < .05$

Table 14

Correlations Between Demographic Factors and IBMAS Subscales

Variables	Instructional Approaches		Behaviour Management	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Courses in Special Education/ Exceptional Learners	.23	.018*	.22	.020*
Amount Learned about ADHD in Teacher Training	.25	.009*	.12	.207
Professional development training in ADHD	.18	.052	.21	.029*
Age	.02	.833	.03	.751
Gender	-.03	.774	.10	.313
Highest Level of Education	.01	.957	.07	.478
Length of Teaching	.01	.935	.11	.248
Number of children with ADHD taught	.09	.334	.07	.440
Professional development in special education/ exceptional learners	.07	.498	.09	.366

* $p < .05$

Appendix A

Knowledge of Attention Deficit Disorders Scale (KADDS)*

Please read each question, and indicate whether you believe the statement is true or false.

Question No.	Question	Correct Answer	Subscale
1	Most estimates suggest that ADHD occurs in approximately 15% of school aged children.	F	General
2	Current research suggests that ADHD is largely the result of ineffective parenting skills.	F	Treatment
3	Children with ADHD are frequently distracted by extraneous stimuli.	T	Symptom/ Diagnosis
4	Children with ADHD are typically more compliant with their fathers than with their mothers.	T	General
5	In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7.	T	Symptom/ Diagnosis
6	ADHD is more common in the 1 st degree biological relative (i.e. mother, father) of children with ADHD than in the general population.	T	General
7	One symptom of children with ADHD is that they have been physically cruel to other people.	F	Symptom/ Diagnosis
8	Antidepressant drugs have been effective in reducing symptoms for some children with ADHD.	T	Treatment
9	Children with ADHD often fidget or squirm in their seats	T	Symptom/ Diagnosis
10	Parent and teacher training in managing a child with ADHD are generally effective	T	Treatment

	when combined with medication treatment.		
11	It is common for children with ADHD to have grandiosity.	F	Treatment
12	When treatment of a child with ADHD is terminated, it is rare for the child's symptoms to return.	F	Treatment
13	It is possible for an adult to be diagnosed with ADHD.	T	General
14	Children with ADHD often have a history of stealing or destroying other people's things.	F	Symptom/ Diagnosis
15	Side effects of stimulant drugs (e.g. Ritalin) used for treatment of ADHD may include mild insomnia and appetite reduction.	T	Treatment
16	Current wisdom about ADHD suggests two clusters of symptoms. One of inattention and the other consisting of hyperactivity and impulsivity.	T	Symptom/ Diagnosis
17	Symptoms of depression are found more frequently in children with ADHD than in non-ADHD children.	T	General
18	Individual psychotherapy is usually sufficient for the treatment of most children with ADHD.	F	Treatment
19	Most children with ADHD "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood.	F	General
20	In severe cases of ADHD, medication is often used before other behaviour modification techniques are attempted.	T	Treatment
21	In order to be diagnosed with ADHD, a child must exhibit relevant symptoms in	T	Symptom/ Diagnosis

	two or more settings (e.g. home and school).		
22	If a child with ADHD is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework.	F	General
23	Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.	F	Treatment
24	A diagnosis of ADHD by itself makes a child eligible for certain educational interventions.	F	General
25	Stimulant drugs are the most common type of drug used to treat children with ADHD.	T	Treatment
26	Children with ADHD often have difficulties organizing tasks and activities.	T	Symptom/ Diagnosis
27	Children with ADHD generally experience more problems in unfamiliar situations (e.g., concert at school) than in familiar situations (e.g., regular classroom).	F	Treatment
28	There are specific diagnostic tests which can be given by medical doctors (e.g. pediatrician) to make a definitive diagnosis of ADHD.	F	General
29	In school age children, the prevalence of ADHD in males and females is equivalent.	F	General
30	In very young children (less than 4 years old), the symptoms of children with ADHD are distinctly different from school-aged children with ADHD.	F	General
31	It is more obvious that a child has ADHD in a classroom setting, than in a free play setting.	T	General

32	The majority of children with ADHD evidence some degree of poor school performance in the elementary school years.	T	General
33	Children who are adopted or live in foster care have a higher likelihood of being diagnosed with ADHD.	T	General
34	Behavioural/Psychological interventions without medication have been found to be an effective treatment for severe cases of ADHD.	F	Treatment
35	Chiropractics has been proven to be an effective treatment for severe cases of ADHD	F	Treatment
36	Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD.	F	Treatment

*Sciutto, M.J., Terjesen, M.D., & Bender, F.A.A. (2000). Teachers' knowledge and misperceptions of Attention-Deficit/Hyperactivity Disorder. *Psychology in the Schools*, 37, 115-122.

Note. Modified to make appropriate for the Nova Scotian educational context (e.g., Item #24: "placement in special education" was replaced with "for certain educational interventions" since placement in special education classes is not commonplace in NS.)

Appendix B

Beliefs about Attention Deficit Hyperactivity Disorder*

Please indicate which answer best reflects your belief for each question, based on the following scale:

Strongly Disagree (1 pt)	Disagree (2 pts)	Neutral (3 pts)	Agree (4 pts)	Strongly Agree (5 pts)
Question No.	Question			
1	ADHD is a valid diagnosis.			
2	ADHD is an excuse for students to misbehave.			
3	ADHD is diagnosed too often.			
4	ADHD is a behaviour disorder that should <u>not</u> be treated with medication.			
5	All children with ADHD should take medication.			
6	Medications such as Ritalin and Dexamphetamine should only be used as resort.			
7	ADHD results in a legitimate educational problem.			
8	Having a student with ADHD in my class would disrupt my teaching.			
9	I would feel frustrated having to teach a student with ADHD.			
10	Young students with ADHD should be treated more leniently than older students with ADHD.			
11	Students with ADHD should be taught by specialist teachers, not classroom teachers.			
12	I would prefer to teach a student who is over-active more than a student who is inattentive.			
13	Most students with ADHD don't really disrupt class that much.			
14	Students with ADHD should <u>not</u> be taught in the regular classroom.			
15	The extra time teachers spend with students with ADHD is at the expense of students without ADHD.			

- 16 Other students don't learn as well as they should when there is a student with ADHD in the classroom.
- 17 You cannot expect as much from a student with ADHD as you can from other students.
- 18 Students with ADHD could control their behaviour if they really wanted to.
- 19 Students with ADHD misbehave because they are naughty.
- 20 Students with ADHD cannot change the way they behave.
- 21 Students with ADHD could do better if only they'd try harder.
- 22 Students with ADHD have little control over the way they behave.
- 23 Students with ADHD misbehave because they don't like following rules.
- 24 Students with ADHD are just as difficult to manage in the classroom as any other student.
- 25 Managing the behaviour of students with ADHD is easy.
- 26 I have the skills to deal with students with ADHD in my class.
- 27 I have the ability to effectively manage students with ADHD.
- 28 I am limited in the way I manage a student with ADHD.
- 29 My school has policies that regulate how teachers manage a student with ADHD.
- 30 Other staff members influence how I would manage a child with ADHD.
- 31 Parents of students with ADHD influence how I would manage a student with ADHD.

*Kos, J. (2008). What do primary teachers know, think and do about ADHD? *Australian Council for Educational Research, Teaching and Learning and Leadership*: http://research.acer.edu.au/tll_misc/8

Note:. Modified by to make appropriate for the Nova Scotian educational context (e.g., Item #11: "Children with ADHD should be taught by special education teachers" was replaced with "Children with ADHD should be taught by specialist teachers, not classroom teachers" since the "special education teacher" label is not generally used in Nova Scotia).

Appendix C

Seven Factors Identified through Factor Analysis (B-ADHD) (Kos, 2008)

Factor 1. Lack of Control: “A perception by teachers that children with ADHD have very little control over their own behaviour, and that managing the behaviour of these children is quite difficult.” (Items 18, 23, 21, 17, 25, 14)

Factor 2. Negative Classroom Effects: “Showed a belief that children with ADHD have a negative effect on the classroom environment, where children were seen as a disruption and a frustration to teaching.” (Items 15, 16, 8, 11, 9)

Factor 3. Diagnostic Legitimacy: “Indicated an acceptance of the diagnosis of ADHD.” (Items 1, 2, 7, 4)

Factor 4. Perceived Competence: “Showed that teachers believe they have the skills and ability to manage students with ADHD.” (Items 27, 26, 28)

Factor 5. Influences to Management: “Indicated that teachers’ classroom management of a student with ADHD would not be strongly influenced by parental or staff beliefs, or the ADHD-status of a child.” (Items 31, 30, 24)

Factor 6. Expectations: “Revealed that teachers hold some expectations about ADHD and the children with the condition.” (Items 17, 10, 6)

Factor 7. External control: “A belief that external agents (e.g., medication and policy) may be required in the management of ADHD.” (Items 5, 29, 22)

Appendix D

Instructional and Behavior Management Approaches Survey (IBMAS)*

Please indicate the extent to which you currently use each of the following types of approaches/techniques to manage a student with attention and/or behavioural difficulties in your classroom.

Rarely 1	Seldom 2	Occasionally 3	Frequently 4	Most of the time 5
-------------	-------------	-------------------	-----------------	-----------------------

Question

No.

Question

- | | |
|----|--|
| 1 | Preferential seating assignment (e.g., sitting near the front of the room) |
| 2 | Verbal reprimands |
| 3 | Modifying language used for instruction (e.g., speaking slowly, shortening sentences, repeating instructions) |
| 4 | Providing assistance during transitions |
| 5 | Using nonverbal cues (e.g., hand movement) to remind student to refocus student on task |
| 6 | Providing concrete cues and supports (e.g., visual cues/posters, diagrams) |
| 7 | Shortening assignments |
| 8 | Daily Report Card – Home/School |
| 9 | Providing consequences for misbehavior (e.g., remove a privilege) |
| 10 | Creating a behavioral contract |
| 11 | Chunking assignments into smaller sections |
| 12 | Giving student a choice in academic tasks and/or assignments |
| 13 | Providing student with more immediate and frequent feedback about performance on assignments or activities |
| 14 | Providing student with explicit strategy instruction (e.g. study skills, learning strategies, how to take notes) |

- 15 Selective ignoring (ignoring certain behaviors)
- 16 Self-management system (training students to self-monitor and evaluate their own behavior)
- 17 Implementing positive behavioral support plans
- 18 Simplifying instructions and giving them in a step by step manner
- 19 Providing student with a peer tutor or study partner
- 20 Helping the student set goals and monitor progress
- 21 Functional behavioral assessment (identifying problem behaviors, identifying actions that precede or follow the behavior, identifying frequency and severity of behavior, and then using this information to develop an intervention plan)
- 22 Proximity control (moving close to the student)
- 23 Token economy (give tokens for appropriate behavior and remove tokens for inappropriate behavior)
- 24 Providing advance organizers for content
- 25 Lowering expectations for work
- 26 Teaching student how to organize or plan
- 27 Providing rewards or incentives
- 28 Providing positive teacher attention (praise, encouragement)
- 29 Removing student from the classroom for misbehavior
- 30 Providing written directions as well as oral directions
- 31 Using choral response techniques (e.g., response cards)
- 32 Teaching appropriate behavior (e.g., social skills) and rehearsing it with the student
- 33 Frequent communication with parents (e.g., conferences, phone calls)

- 34 Providing student with guided notes for content
- 35 Adjusting materials for student (e.g., adding color, more structure)
- 36 Time out
- 37 Highlighting key points in lesson for student
- 38 Providing student with alternative formats in which tests or assignments are completed
- 39 Teaching student how to use an assignment notebook
- 40 Response cost behavior management (points or tokens are earned for specific appropriate behavior and deducted for specific inappropriate behaviors)

* Martinussen, R., Tannock, R., & Chaban, P. (2011). Teachers' reported use of instructional and behavior management practices for students with behavior problems: Relationship to role and level of training in ADHD. *Child & Youth Care Forum*, 40(3), 193-210. doi:10.1007/s10566-010-9130-6

Appendix E

Demographic Questionnaire

- 1) Are you a classroom teacher?
☐ Yes
☐ No
- 2) What grade do you teach? [pull down menu grades 1-6]
- 3) Age (Give number or type "Do not wish to disclose"): _____
- 4) Sex:
☐ Male
☐ Female
☐ Do not wish to disclose
- 5) What is your highest degree conferred?
☐ High School
☐ Bachelors
☐ Master's
☐ PhD
☐ Other (please specify: _____)
- 6) For how long have you been teaching?
____years ____months
- 7) Which grade(s) have you taught in your teaching career? Check all that apply:
☐ Elementary (P-6)
☐ Junior High School (7-9)
☐ Senior High School (10-12)

If you taught elementary, for how many years did you do so? _____
If you taught junior high, for how many years did you do so? _____
If you taught high school, for how many years did you do so? _____
- 8) What type of teacher are you?
☐ Full-time classroom
☐ Part-time classroom
☐ Resource/Program Support
☐ Learning Center
☐ Supply
☐ Other (please specify: _____)

- 9) Did you take any courses in special education/exceptional learners during teacher training?

☐ Yes
☐ No

If you answered "Yes" to the previous question, how many special education/exceptional learners courses did you take? (Please estimate to the nearest half-credit/three month course):

If you answered "Yes" to the previous question, please indicate the names of the special education/exceptional learners courses you have taken: _____

- 10) How much did you learn about ADHD during your teacher training?

☐ Nothing
☐ Very little
☐ Some
☐ A lot

- 11) Approximately how many children with ADHD have you taught in your teaching career? _____

- 12) Have you received support in dealing with your students with ADHD?

☐ Yes
☐ No

- 13) If you have received support, from whom? (If you answered "No" to the previous question, please select "Not applicable"):

☐ Other Teachers
☐ School System
☐ Parents
☐ Clinical Psychologist
☐ School Psychologist
☐ Other (please specify: _____)
☐ Not applicable

- 14) Have you received inservice/professional development training focused on special education/exceptional learners?

☐ Yes
☐ No

If "Yes," approximately how many hours of professional development training have you completed on special education/exceptional learners? _____

15) Have you attended any inservices/professional development seminars specifically about ADHD?

- ☐ Yes
☐ No

Approximately how many hours of professional development training have you completed on ADHD? _____

16) How would you rate your current knowledge of ADHD?

- ☐ Very knowledgeable
☐ Moderately knowledgeable
☐ A little bit knowledgeable
☐ Not very knowledgeable
☐ Unknowledgeable

17) Do you have experience with children with ADHD that have taken or are currently taking medication as a form of treatment?

- ☐ Yes
☐ No
☐ Don't know

18) If you answered "Yes" to the previous question, approximately how many children with ADHD that have taken or are currently taking medication for ADHD as a form of treatment do you have experience with? _____