

Australian Council for Educational Research (ACER)

From the Selected Works of Dr Julie Kos

July, 2004

Primary school teachers' knowledge, attitudes and behaviours toward children with attention-deficit/hyperactivity disorder

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**Primary school teachers' knowledge, attitudes, and behaviours toward
children with Attention-Deficit/Hyperactivity Disorder**

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Bachelor of Arts
(Honours in Psychology)

A thesis submitted to
RMIT UNIVERSITY
in fulfilment of the requirements for the degree of
DOCTOR OF PHILOSOPHY
School of Health Sciences
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July, 2004

STATEMENT OF AUTHORSHIP

I certify that:

- a) except where due acknowledgement has been made, the work is that of the candidate alone;
- b) the work has not been submitted previously, in whole or in part, to qualify for any other academic award;
- c) the contents of the thesis is the result of work which has been carried out since the official commencement date of the approved Doctor of Philosophy research program.

Signed:

Julie Kos

Dated: July 12th 2004

ACKNOWLEDGMENTS

First and foremost I would like to thank my wonderful supervisor, Dr Amanda Richdale. I am so grateful for her tireless enthusiasm, encouragement and understanding, and thank her with all of my heart. I don't know what I would have done without you Mandy. You have inspired my love for research even further, and wherever my life takes me I will never forget you and the positive impact you have had on me.

I would also like to thank my second supervisor, Mr Mervyn Jackson, especially for his help with the development of the testing instruments and his expertise in social psychology.

Thanks also to Dr Emma Little (and her husband), Dr Kerry Hempenstall, Dr Ray Wilks, Dr Nicole Dowling, and Professor Alan Hudson, for their guidance in developing the questionnaire. To Dr John Reece, thank you for your time, effort, and patience in helping me understand the intricacies of statistical analyses, and for increasing my desire to follow a research career.

A huge big thank you to my family for always being there and understanding that although I tried, I couldn't always be there. Mum, you are certainly my biggest inspiration—your support and encouragement over the years has been instrumental in my success and in getting me where I am today. Thank you for being you! A special thank you to my sister Belinda—the workshop would not have been as successful without you. You're a star! In addition, thanks to my beautiful nieces, Kayla and Millee, who showed patience beyond their years and also gave me endless cuddles and kisses throughout my studies. I love you all.

Finally, I would like to show my gratitude to the teachers and principals who gave so freely of their time. Without you all, this project would never have been possible. I sincerely hope this project can benefit teachers as well as children with ADHD.



This dissertation is dedicated to my mum
Sharon Kos

*

*Success is about having dreams, believing in your ability,
and letting nothing stand in your way*

*

PUBLICATION DETAILS

Publications

Parts of section 1.3 have been published as:

Kos, J.M., & Richdale, A.L. (2004). History of attention-deficit/hyperactivity disorder. *Australian Journal of Learning Disabilities*, 9, 22-24.

Parts of chapters 6 and 7 have been published as:

Kos, J. (2001). Primary school teachers' knowledge, attitudes, and behaviour towards children with attention deficit hyperactivity disorder (Abstract). *Australian Journal of Psychology*, 53 (1), 54.

Parts of chapters 6 and 8 have been published as:

Kos, J.M., Richdale, A.L., & Jackson, M.S. (2004). Knowledge of attention-deficit/hyperactivity disorder: A comparison of in-service and pre-service teachers. *Psychology in the Schools*, 41, 517-526.

Parts of chapter 9 have been published as:

Kos, J. (2003). Enhancing teachers' knowledge about ADHD (Abstract). *Australian Journal of Psychology*, 55, 1.

Conference Presentations

Parts of chapters 6 and 7 have been presented as:

Kos, J., Richdale, A., & Jackson, M. (2003). How do teachers manage ADHD students in the classroom? Paper presented at *The National Conference of the Australian Association for Cognitive Behaviour Therapy* (September 15-18 2003), Adelaide, Australia.

Kos, J. & Richdale, A. (2003). Teachers' classroom management of students with ADHD. Paper presented at *Victorian Parenting Centre* (December 4 2003), Melbourne, Australia.

Kos, J., Richdale, A., & Jackson, M. (2001). Primary school teachers' knowledge, attitude, and behaviour towards children with attention deficit hyperactivity disorder. Paper presented at *The Victorian State Conference of the Australian Association for Cognitive Behaviour Therapy* (November 23 2001), Melbourne, Australia.

Kos, J., Richdale, A., & Jackson, M. (2000). Primary school teachers' attitudes and behaviour towards children with attention deficit hyperactivity disorder. Paper presented at the *Victorian State Conference of the Australian Association for Cognitive Behaviour Therapy* (December 1 2000), Melbourne, Australia.

Kos, J. (2000). Primary school teachers' knowledge and attitudes toward children with attention deficit hyperactivity disorder. Paper presented at *The First Victorian Postgraduates in Psychology Conference* (September 9 2000), Melbourne, Australia.

Parts of chapter 8 have been presented as:

Kos, J. (2001). Knowledge about ADHD: A comparison of in-service and pre-service teachers. Paper presented at *The Second Victorian Postgraduates in Psychology Conference* (November 24 2000), Melbourne, Australia.

Parts of chapters 9 have been presented as:

Kos, J. (2002). Enhancing teachers' knowledge about ADHD. Paper presented at *The Third Victorian Postgraduates in Psychology Conference* (November 23 2002), Melbourne, Australia.

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SUMMARY

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common childhood disorder affecting approximately five percent of primary school-aged children. The disorder is characterised by severe difficulties in one or more of three areas; inattention, impulsivity, and hyperactivity. There are a variety of assessments used to help diagnose ADHD; interviews, behaviour checklists, medical assessments, and ancillary tests. Furthermore, there are numerous treatment options available, including psychological, biological, and alternative treatments. Whilst the aetiology of ADHD is unclear, there have been a number of possible causes put forth, including psychological, biological, and environmental suggestions.

Considering that primary school teachers are often the first to notice behavioural difficulties in children, it is surprising that relatively little research has assessed teachers' knowledge, attitudes and behaviour toward this disorder. There is also a lack of literature on pre-service (student) teachers. The research that has been conducted on teachers' knowledge has shown that knowledge scores range from about 48 to 70 percent. Unfortunately, past research that has attempted to measure teachers' attitudes toward ADHD has not really done so. Instead this research has tended to further assess the ADHD knowledge of teachers. There is also a dearth of research assessing teachers' classroom management of children with ADHD, and very little emphasis has been placed on understanding the links between teachers' knowledge, attitudes, and behaviour, particularly within a theoretical context. In an attempt to further understand the links between teachers' knowledge, attitudes, and behaviour, two social psychological theories (Theory of Reasoned Action [TRA] and Theory of Planned Behaviour [TPB]) were used.

Based on a consideration of past research, four studies were conducted. The first study involved an investigation of primary school teachers' knowledge and attitudes toward ADHD. The sample consisted of 120 Catholic and private primary school teachers. Questionnaires were distributed to teachers, who were then given two weeks to complete the questionnaire. Completed questionnaires were collected from each of the 16 participating schools. On average, teachers' actual knowledge was better than their perceived knowledge, yet was not as high as was anticipated from past research. There were also a number of variables that correlated with perceived and actual knowledge, including having ever taught a student with ADHD and additional ADHD training. A factor analysis on study 1's attitude items showed that teachers' attitudes about ADHD can be grouped into seven main clusters; lack of control, negative classroom effects, diagnostic legitimacy, perceived competence, influences to management, expectations, and external control. The TRA and the TPB were shown to have differential predictive utility across the five behaviour management strategies assessed and

across teacher sub-samples (all teachers compared to those who were currently teaching an ADHD student).

The second study assessed the behaviour management strategies primary school teachers use in the classroom to manage students with ADHD. The frequency that teachers used five psychological strategies (positive reinforcement, punishment, planned ignoring, organising the classroom and curriculum, and emotional support) was assessed. There were two phases to the study. The first phase asked teachers to indicate when they used one of the five strategies to manage the behaviour of a student with ADHD (i.e., tick the box). The second phase asked teachers to record examples of the strategies they used (i.e., what did you do?), as well as the antecedents and consequences for using that strategy. Participants were a sub-sample of the Catholic and private primary school teachers used in study 1 (Phase 1: $n=25$; Phase 2: $n=12$). The results showed that the most commonly used strategy by teachers in the classroom management of students with ADHD was positive reinforcement. The least commonly used strategy was planned ignoring. Teachers were also shown to accurately label the strategies they used.

The third study involved an assessment of pre-service primary school teachers' knowledge and attitudes towards children with ADHD, which were then compared to the in-service sample. Similar to study 1, this study showed that perceptions of knowledge were significantly lower than actual knowledge scores. Furthermore, when compared to in-service teachers, pre-service teachers' perceived and actual knowledge scores were significantly lower. While most attitudes were similar across pre-service and in-service teachers, there were some differences.

Study 4 involved the implementation of an ADHD Workshop, which was developed based on the findings of studies 1 and 2. Nine primary school teachers (8 female) attended the workshop, and their ages ranged from 23 to 49 years, with an average age of 36.22 years ($SD = 9.68$ years). Teacher's demographic details, perceived and actual ADHD knowledge, and their attitudes regarding ADHD were assessed pre-test, post-test and at three-month follow-up. Measures were also taken at post-test and follow-up to evaluate teachers' satisfaction with the workshop. A within-subjects ANOVA showed that both teachers' perceived and actual knowledge was significantly lower at pre-test than it was at either post-test or three-month follow-up, and there was no significant change in knowledge between post-test and follow-up. Attitudes regarding ADHD were shown to remain somewhat constant across the three testing periods. A within-subjects ANOVA showed that teachers' attitude toward only one of the 14 attitude items significantly changed across time.

Further, it was shown that teachers overwhelmingly perceived the workshop in a positive light both at post-test and follow-up. They reported being satisfied with the content, time and location of the workshop, and were highly satisfied with the presentation of the material. Teachers also expressed an increased knowledge of ADHD and self-confidence in teaching students with the disorder. Finally, teachers reported using a number of the strategies covered in the workshop three months after their attendance, and stated that they intended to continue using them in the future.

Overall, this dissertation has provided a much-needed insight into teachers' knowledge, attitude, and behaviour toward children with ADHD. While some of the findings from this project are comparable to those from past research, much of what was reported on represents novel findings. Further, there were some limitations inherent in this project, and as well, various suggestions have been offered to enhance teacher training and classroom management practices. Theoretical suggestions were also offered that may enhance research in this area, enabling a better understanding of ADHD within the education system.

CHAPTER 1: ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: A REVIEW OF THE LITERATURE

1.1 Overview

This chapter provides a discussion of Attention-Deficit/Hyperactivity Disorder (ADHD), including the current definition of ADHD, information about the history of the disorder, and the classificatory systems currently used to diagnose difficulties with attention and overactivity. The epidemiology of ADHD, the prognosis for those with the disorder, and comorbidity between ADHD and other psychological disorders are also reviewed. The chapter concludes with details about presently unresolved diagnostic issues and critiques regarding the disorder itself, as well as a summary and suggestions for future research.

1.2 Current Definition

The current edition of the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition – Text Revision (DSM-IV-TR) regards ADHD as a behavioural disorder that usually presents in childhood (American Psychiatric Association [APA], 2000). The disorder is characterised by three main features; inattention, hyperactivity, and impulsivity (APA). A child with inattentive symptoms might find it difficult to sustain attention, particularly when effort is required (APA; Montague & Warger, 1997). Furthermore, these difficulties appear to fluctuate, and may be dependent on the setting (Montague & Warger). Research has shown that children with attention problems are nevertheless able to sustain their attention on tasks that are novel and on those tasks that they enjoy (Drummond, 2000).

Hyperactivity means that an individual is extremely overactive. Behaviours indicative of hyperactivity include having difficulty staying seated and being constantly on the go (APA, 2000; Drummond, 2000). Whilst hyperactivity is not necessary for an ADHD diagnosis, it is commonly found in children diagnosed with the disorder (Lahey et al., 1998). Impulsivity is closely related to overactivity, and although these two symptoms are regarded as separate features, they are currently diagnosed together (APA). That is, children cannot be diagnosed with hyperactive problems only, but must also be diagnosed with impulsivity (APA).

Impulsivity may be exhibited by a child being inpatient, blurting out answers before questions have fully been asked, interrupting others' conversations, not waiting their turn in class or in other play activities, and speaking without first considering the consequences of what they are about to say (APA; Drummond).

Finally, although each of these three symptoms (inattention, hyperactivity, impulsivity) are characteristic of ADHD, they do not all need to be present for a child to be diagnosed with the disorder (APA, 2000). For example, a child might be diagnosed with ADHD if he has severe inattention problems, and yet has no difficulties with overactivity or impulsivity. Similarly, a child with hyperactive/impulsive symptoms and no attention difficulties, might also be diagnosed with ADHD. The specific symptoms and criteria used in the DSM-IV-TR to diagnose ADHD will be discussed in greater detail later in this chapter (see section 1.3.1). Although these criteria and the current definition of ADHD are relatively recent, the current diagnosis has evolved over the past one hundred years.

1.3 History

The development of the current definition of ADHD has a long history, dating back to at least the late 1800's. It was at this time that a German doctor, Heinrich Hoffman, wrote a children's story for his son about a young boy called "Fidgety Phil". A translated excerpt from the book clearly describes ADHD-related behaviours - "Fidgety Phil, he won't sit still, he wriggles, and giggles... The naughty restless child growing still more rude and wild" (Stewart, 1970, p. 94).

Storybooks aside, the medicalisation of overactivity in children began in 1902 when Dr. George Still gave three lectures on *abnormal psychical conditions in children* (Still, 1902a,b,c). These lectures centred on descriptions of the abnormal behaviours of young children seen in clinical practice, either by Still himself or his colleagues. The lectures also touched on aetiology, suggesting that intellectual impairment, physical disease and trauma, family history, environment, and individual differences, might be responsible for children's

behaviour problems. Still, like most theorists of the early 20th century, believed that overactivity (or moral impairment to use the terminology of the time) was closely associated with intellectual impairment (Still, 1902a). However, Still was contemporary for his time, arguing that typically developing children could also experience problems with moral control, suggesting that this impairment might likely be caused by an abnormal mental state or by injury to the brain (Still, 1902a,c). These problems included difficulties such as being forgetful, fidgety, spiteful, unable to maintain attention, stealing and annoying others.

The majority of the difficulties described in Still's (1902a,b,c) lectures are characteristic of each of the three DSM-IV-TR (APA, 2000) behaviour disorders: ADHD, Oppositional Defiant Disorder (ODD), and Conduct Disorder (CD). For example, being forgetful, fidgety, and unable to maintain attention are features of ADHD (APA). Losing one's temper, arguing, being spiteful, and annoying others are characteristic of ODD (APA), and threatening others, hitting children with sticks, killing animals, stealing, and setting fires are all behaviours associated with CD (APA). Furthermore, Still (1902c) noted that there were degrees of severity across the behaviours of his patients, and this too is consistent with today's diagnoses—behaviours associated with CD are generally more severe than behaviours associated with either ADHD or ODD (APA).

The belief that behavioural difficulties were the result of trauma to the brain continued to be strong well into the 1900's. During 1917 to 1918, there was a viral encephalitis epidemic, and doctors noted that many of the children infected with the virus became inattentive, had poor memory, and little impulse control (Holowenko, 1999). Some years later, Kahn and Cohen (1934) argued that behavioural difficulties were *organically driven*, and were the result of "a *surplus* of inner impulsion" (p. 749). That is, Kahn and Cohen believed that damage to the brain stem could result in the development of excessive energy in an individual, and the consequence of this pent up energy would be excessive behaviours (*hyperkenesis*), such as not staying seated, disturbing other children, and having difficulty

working independently. In 1937, Bradley noted that the primary characteristics of the *Hyperactivity Syndrome* were short attention span, dyscalculia, mood lability, hyperactivity, impulsiveness, and poor memory, and these symptoms were attributed to difficulties at birth (e.g., anoxia or hypoxia) and later illnesses, such as pneumonia (Rosenfeld & Bradley, 1948).

In the 1940s, the terms *Minimal Brain Damage* and *Minimal Brain Dysfunction* were adopted to explain overactivity in children (Holowenko, 1999). Research over the following years continued to support the *causal* notion of brain damage, and it seems that these beliefs continue to the current day, even though the impact biology has on ADHD-related behaviours is unclear. That is, it appears that although clinical and research studies have only shown correlations between biology and ADHD-related behaviours, the medical profession has tended to perceive a causal connection between biology and behaviour difficulties.

1.3.1 Formal Classification: History

Diagnostic and statistical manual of mental disorders (DSM). Neither hyperactivity nor inattentiveness were included as diagnoses in the first edition of the DSM (APA, 1952). The second edition of the DSM, however, used the term *Hyperkinetic Reaction of Childhood* to describe children who exhibited patterns of extreme overactivity (APA, 1968). The DSM-III introduced the label *Attention Deficit Disorder* (APA, 1980), and marked the first move towards seeing childhood behavioural difficulties as more than simply difficulties with overactivity. That is, the DSM-III distinguished between the three major dimensions of the disorder; inattention, impulsivity and hyperactivity (APA, 1980). Based on these three dimensions, two separate diagnostic categories were included in the DSM-III (APA, 1980). Children who exhibited problems in each of the three dimensions were diagnosed as Attention Deficit Disorder with Hyperactivity (ADD-H). Attention Deficit Disorder without Hyperactivity (ADD-WOH) was used to label children who showed deficits in attention and impulsivity only (APA, 1980). The distinction between the three dimensions was dropped in the next revision, the DSM-III-R (APA, 1987). The DSM-III-R utilised a single list of

symptoms, with children receiving a diagnosis of *Attention Deficit Disorder* when they met a certain number of criteria from the symptom list. Children would have been diagnosed with ADD when symptoms were observed *either* at home or at school (APA, 1987).

In 1994, the DSM-IV saw a return to the three-dimensional structure of labelling (inattention, impulsivity, hyperactivity), with the introduction of the term *Attention-Deficit/Hyperactivity Disorder* (ADHD; APA, 1994). Unlike the DSM-III, the DSM-IV did not distinguish between impulsive and hyperactive children (APA, 1994). Furthermore, the DSM-IV provided a more stringent classification than its predecessor, the DSM-III-R, by specifying that in order to be diagnosed with ADHD, a child's symptoms must be observed in two (rather than one) settings (APA, 1987, 1994).

The most current edition of the DSM, DSM-IV-TR, continues to use the term ADHD to label individuals with severe hyperactive, impulsive, and/or inattentive difficulties (APA, 2000). There are no differences between the 1994 and the 2000 editions of the DSM in terms of diagnostic criteria, however the DSM-IV-TR provides some additional information in a number of sections; including, diagnostic features, associated laboratory findings, prevalence, course, and familial pattern (APA, 1994, 2000).

International classification of diseases (ICD). At its first publication in 1900, the ICD was referred to as The International List of Causes of Death, and this title remained until its sixth revision in 1950 (Taylor, 1992). The sixth revision of the ICD saw a renaming of the classificatory system to the International Statistical Classification of Diseases, Injuries, and Causes of Death (Taylor; World Health Organisation [WHO], 1950). Although this name change was made to encompass the inclusion of non-fatal diseases, behavioural disorders remained absent from the system (Bramley, 2002).

Because the main purpose of the ICD from its inception was to classify causes of death, and later death, disease, and injury (Colorado Department of Public Health and Environment [CDPH&E], 2001; Taylor, 1992), it was not until 1967, that behavioural

disorders of childhood were included as diagnoses (WHO, 1967). The 1967 edition was referred to as ICD-8, and was used in Australia from 1968 to 1978 (Bramley, 2002). ICD-8 used the term *Hyperkinesia* to label children who experienced difficulties with attention, impulsivity, and overactivity, as well as *all* other behavioural disorders (WHO, 1967). That is, the diagnosis of Hyperkinesia would have encompassed all of the externalising behaviour disorders classified in the DSM, including ADHD, ODD and CD (APA, 2000).

The ninth revision of the ICD used various terms to classify children with behavioural difficulties. For example, the term *Hyperkinetic Syndrome of Childhood* was used to classify children with short attention span and distractibility, and the term *Simple Disturbance of Activity and Attention* was used to diagnose children who were distractible, overactive, and had a short attention span (WHO, 1977). These two diagnoses appear to correspond with the DSM-IV-TR diagnoses of ADHD, predominately inattentive type, and ADHD, combined type, respectively (APA, 2000). Furthermore, *Hyperkinesis with Developmental Delay* was used to label children who had *Hyperkinetic Syndrome of Childhood* in addition to some form of developmental delay (WHO, 1977). Whereas, *Hyperkinetic Conduct Disorder* was used to classify children with *Hyperkinetic Syndrome of Childhood* and severe conduct problems (WHO, 1977). ICD-9 also included two additional categories; other and unspecified (WHO, 1977), which generally correspond with the DSM-IV-TR diagnosis of ADHD, not otherwise specified (APA, 2000).

The United States of America (USA) released a clinical modification of the ICD-9 in 1986 (ICD-9-CM), which was used in most Australian states from July 1987 to June 1998 (Bramley, 2002). Under the ICD-9-CM, children experiencing difficulties with attention and overactivity could be classified as having either *Attention Deficit Disorder (ADD) Without Mention of Hyperactivity*, or *ADD With Hyperactivity*, depending on their symptom profile (Bramley). According to Bramley, the term *Minimal Brain Dysfunction* appears to be used interchangeably with the diagnosis of *Hyperkinetic Syndrome of Childhood* in the ICD-9. The

additional diagnoses mentioned above (Hyperkinesis with developmental delay, Hyperkinetic conduct disorder, Unspecified hyperkinetic syndrome) continued to be used in the clinical modification (Bramley).

The ICD-10 removed the diagnosis of *ADD Without Mention of Hyeractivity* as a hyperkinetic disorder, and placed it in *Other Specified Behavioural and Emotional Disorders With Onset Usually Occurring in Childhood and Adolescence* (WHO, 1992). The ICD-10 *per se* has never been used in Australia for classifying morbidity. However, Australia has released its own modification of the ICD-10, referred to as the ICD-10-Australian Modification (ICD-10-AM; Bramley, 2002). These editions have been developed by The National Centre for Classification in Health (NCCH), and have been in effect since approximately 1998 (Bramley).

The first edition of the ICD-10-AM was implemented in Victoria, New South Wales, Northern Territory, and Australian Capital Territory on July 1st 1998, and on July 1st 1999 in the remaining four Australian states. The second edition was implemented on July 1st 2000 across all Australian states, and the current edition was implemented on July 1st 2002. There are no differences between the three ICD-10-AM editions in terms of hyperkinetic disorders (Bramley, 2002).

Overall, difficulties with attention, overactivity, and impulsivity have been documented for over a century. However, the main emphasis over time has centred around the overactivity of the child, rather than a combination of the three main characteristics of the disorder. Finally, this brief historical review about ADHD has shown that the disorder is not a new, socially constructed phenomonon, but rather, ADHD is the result of a culmination of research and clinical findings over the past 100 hundred years.

1.4 Current Classificatory Systems

The current diagnostic system used to classify most individuals with ADHD in Australia is the DSM-IV-TR (APA, 2000; National Health and Medical Research Council [NHMRC], 1997). However, code numbers from the ICD-10 are often used in Australian hospitals for statistical purposes. Like Australia, the DSM is the most commonly used system to diagnose ADHD in the USA (APA). However, the ICD-10 is the most commonly used system in the United Kingdom (WHO, 1992). The criteria used to diagnose individuals with attention and/or overactivity difficulties in both the DSM-IV-TR and the ICD-10 are detailed below.

1.4.1 DSM-IV-TR

The DSM-IV-TR system of classification requires that each of six criteria (A to E) be met. Criterion A is separated into two parts, A1 and A2. Criterion A1 assesses inattentive symptoms by requiring clinicians to determine if the child has experienced (and continues to experience) six or more of nine difficulties listed. Inattentive symptoms include failing to give close attention to details or making careless mistakes, having difficulty sustaining attention, not listening, not following through on instructions or set tasks, having difficulty organising tasks and activities, avoidance or dislike of activities requiring mental effort, losing things, being easily distracted, and being forgetful (APA, 2000).

Criterion A2 assesses both hyperactive and impulsive symptoms by assessing whether the child experiences six or more of the nine symptoms. Six of the problems are classified as hyperactive symptoms, and three as impulsive symptoms. The minimum number of symptoms (six) required to fulfil criterion A2 can be made up of any combination of hyperactive and impulsive symptoms. The six hyperactive symptoms include being fidgety, being out of seat, running or climbing excessively, having difficulty playing quietly, being on the go or acting as if driven by a motor, and talking excessively. The three impulsive

symptoms are often blurting out answers, having difficulty awaiting turn, and often interrupting or intruding on others.

For both criterion A1 and A2 the six (or more) symptoms need to have persisted for at least six months for a child to be diagnosed with ADHD. Furthermore, the symptoms must have persisted to a degree that is maladaptive and inconsistent with the child's developmental level. Although inattentive and hyperactive/impulsive symptoms are separated within criterion A, there are not two separate DSM-IV-TR diagnoses for these difficulties. That is, if a child fits criterion A1 (but not A2), they will be given a diagnosis of ADHD, predominantly inattentive type. Similarly, if a child fits criterion A2 (but not A1), they will be given a diagnosis of ADHD, predominantly hyperactive/impulsive type. If a child fits both criterion A1 and A2 they will be diagnosed with ADHD, combined type.

Criterion B states that some of the hyperactive/impulsive or inattentive symptoms that cause impairment for the child were present before the child was seven years of age. Criterion C states that some impairment from the symptoms must be present in two or more settings. For example, the child might have behavioural difficulties at home and at school. Criterion D notes that there must be clear evidence of clinically significant impairment in social, academic, or occupational functioning. Finally, Criterion E rules out other psychological causes for the child's difficulties. That is, Criterion E requires that the symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder). Once each of these criteria have been met, a child will be diagnosed with one of three subtypes of ADHD; predominantly inattentive type, predominantly hyperactive/impulsive type, or combined type. If a child presents with a number of inattentive or hyperactive-impulsive symptoms, which cause significant impairment, but does not meet criteria for ADHD, that child will be diagnosed as ADHD, Not Otherwise Specified.

1.4.2 ICD-10

The ICD-10 is a second classificatory system that can be used to diagnose abnormal levels of overactivity and ability to sustain attention (WHO, 1992). Whilst rarely used in psychological settings within Australia, the ICD-10 is used often in hospital medical settings to diagnose and code diseases. Furthermore, the ICD-10 is the most commonly used classificatory system throughout the United Kingdom and Europe (CDPH&E, 2001).

Rather than ADHD, the term used to describe difficulties with poor attention, impulsivity, and overactivity, is *Hyperkinetic Disorder* (WHO, 1992). Although the ICD-10 criteria appear to be very similar to the DSM-IV-TR criteria, the classificatory systems themselves are different. First, the ICD-10 is separated into two volumes: volume one contains clinical descriptions and diagnostic guidelines; the second volume contains the diagnostic criteria for research. The DSM-IV-TR on the other hand, has only one volume, which includes criteria to be used by both clinicians and researchers. Second, ICD-10 is a categorical system, meaning that only one single diagnosis can be given to an individual. Whereas, multiple diagnoses are allowable under the DSM-IV-TR system, and diagnoses are then ranked in order of clinical importance and impairment. That is, a child cannot be diagnosed with CD *and* Hyperkinetic Disorder under the ICD-10. However, under DSM-IV-TR, a child can be diagnosed with any number of conditions (e.g., ADHD, CD, and major depressive disorder).

1.5 Epidemiology

The prevalence rates for ADHD vary considerably across studies and have shown a dramatic increase over time (Bridge & Lennard, 2004; Matson, 1993; Sawyer et al., 2001). Matson reported that prevalence rates varied across studies from 2 to 20 percent, however it is generally accepted that ADHD affects between three and seven percent of all children in the United States (APA, 2000). In Australia, ADHD is the most common disorder in children aged between 4 and 17 years (Sawyer et al.), with about 10% of the childhood population

being diagnosed with ADHD (Bridge & Lennard, 2004). Across their sample of 4509 young people, Sawyer et al. reported that ADHD had a prevalence of 11%. Boys were more likely than girls to be diagnosed with ADHD, with 15.4% of boys and 6.8% of girls, having the condition (Sawyer et al.). Broken down into subtypes, these researchers showed that 6% of the sample had ADHD, inattentive type, 3% had ADHD, hyperactive/impulsive type, and 2% had ADHD, combined subtype.

The number of children being diagnosed with ADHD has increased dramatically over time (e.g., APA, 2000; Bridge & Lennard, 2004), but there does not appear to be a valid reason for this increase. There are however three main possibilities. First, changes to diagnostic systems may have meant that more children can be diagnosed with the condition. For example, diagnoses made under DSM-II only included children with extreme levels of overactivity and children with only attention difficulties received no diagnosis under this system (APA, 1968). Conversely, children with overactivity problems *only* were not given a diagnosis under the DSM-III-R (APA, 1987). Therefore, the latest version of the DSM (DSM-IV-TR; APA, 2000), may result in greater numbers of individuals being diagnosed with ADHD simply because they allow for the diagnoses of ADHD, predominately inattentive type, and ADHD, predominately hyperactive/impulsive type. Second, greater numbers of children may be diagnosed with ADHD today simply because health care workers are better trained and educated in regard to ADHD, and are therefore more likely to detect the disorder in presenting children. Finally, the higher prevalence rates may be a reflection of a greater number of children developing the disorder.

Research has also shown that prevalence rates vary both within and across cultures (e.g., Prosser & Reid, 1999; Safer & Malever, 2000). For example, research has shown that more children in Western Australia (WA) are diagnosed with ADHD than in any other Australian jurisdiction, and in fact, the proportion of WA children diagnosed with ADHD is greater than the proportion of children diagnosed in Victoria and Queensland combined

(Prosser & Reid). Cross-culturally, there are very few children diagnosed with ADHD in France, Germany, and Japan, and there are many more American children diagnosed with ADHD than children from elsewhere in the world (DeGrandpre, 2000; Sax, 2000). The reasons for the differential diagnostic incidence of ADHD both within and across countries remain unclear. However, a number of researchers have suggested that socio-economic status, race, age, and the increase in specialised ADHD clinics, may contribute to the increase in the number of children diagnosed with ADHD (Biederman et al., 1995; Prosser & Reid; Safer & Malever).

Prevalence rates of ADHD differ across the genders. In clinic-referred samples, boys are 10 times more likely than girls to be diagnosed with ADHD (Biederman, Mick, Faraone, & Braaten, 2002). However, in the general community the ratio is closer to three males to every one female diagnosed (Biederman et al.; Sawyer et al., 2001). Although boys have been more frequently diagnosed than girls with hyperactivity and inattentiveness over the past century (Biederman et al.; Still, 1992b), the reasons for this gender imbalance are not known.

It is possible that boys are naturally more hyperactive than girls, and are therefore taken to health care professionals more frequently because these difficulties are overt (Anonymous, 2002; Gaub & Carlson, 1997). Adding to this argument is the finding that girls tend to experience more difficulties with inattention than boys (Arnold, 1996; Biederman et al., 2002) – difficulties which are far less observable than difficulties with overactivity, impulsivity, and possibly aggression (Gaub & Carlson). Furthermore, the higher rates of ADHD reported in males might simply be a by-product of comorbidity. For example, rates of comorbidity between ADHD, ODD and CD, are much higher in males than females. And, children with comorbid conditions are more likely to be referred than children with a single diagnosis. Therefore, it may be that boys are referred for assessment more often than girls and therefore have a greater likelihood of being diagnosed with ADHD simply because they are

assessed more frequently. Finally, it is possible that ADHD is simply underidentified and underdiagnosed in girls (Anonymous; Aronold; Gaub & Carlson).

Overall, it is important to note that prevalence rates may be contaminated by diagnoses made under the two different classificatory systems (DSM-IV-TR and ICD-10). For example, a child with a DSM-IV-TR diagnosis of both ADHD and CD would not be diagnosed with ADHD under ICD-10, but rather would be diagnosed with Hyperkinetic conduct disorder (WHO, 1992). This may account for the international variation in reported prevalence rates, but does little to explain state differences reported within Australia.

1.6 Comorbidity

Comorbidity with other psychiatric disorders is very common for individuals with ADHD (Angold, Costello, & Erkanli, 1999; Barkley, 1998; Kube, Peterson, & Palmer, 2002). Newcorn and Halperin (1994) estimated that between 50 and 80 percent of ADHD cases have a comorbid condition. More recent estimates suggest that approximately 60 to 70 percent of individuals with ADHD will have a comorbid condition (Kewley & Latham, 2000). ODD and CD are the most commonly occurring comorbid conditions, with approximately 30 to 50 percent of ADHD individuals also having either of these conditions (Biederman, Faraone, & Lapey, 1992; Gresham, MacMillan, Bocian, Ward, & Forness, 1998; Newcorn & Halperin). Depressive disorders and anxiety disorders have also been shown to commonly co-exist with ADHD (Eiraldi, Power, & Nezu, 1997; Jensen, Shervette, Xenakis, & Richters, 1993). Obsessive Compulsive Disorder is commonly found to co-exist with ADHD, with estimates close to 50 percent (Biederman, Newcorn, & Sprich, 1991; Newcorn & Halperin). Furthermore, learning difficulties and disorders frequently occur concomitantly with ADHD (Dykman & Ackerman, 1991; Tirosh, Berger, Copen-Ophir, Davidovitch, & Cohen, 1998), as do sleep disturbances (Accardo, 1999; Gruber, Sadeh, & Raviv, 2000; McLaughlin-Crabtree, Ivanenko, & Gozal, 2003; Owens, Maxim, Nobile, McGuinn, & Msall, 2000).

While comorbidity in general appears equal across males and females with ADHD (Bird, Gould, & Staghezza, 1993), there are gender differences in terms of comorbid diagnoses. For example, girls are more likely than boys to experience social problems with their peers, and to have a comorbid substance use or anxiety disorder (Biederman et al., 2002; Lahey & Carlson, 1991). Whereas, boys are more likely than girls to experience a comorbid learning disability, major depression, ODD, or CD (Biederman et al.).

1.7 Prognosis

Generally, children do not grow out of ADHD (Cipkala-Gaffin, 1998; Goldman, Genel, Bezman, & Slanetz, 1998). Between 65 and 70 percent of children diagnosed with ADHD will continue to experience *some* symptoms during adolescence and adulthood (Cipkala-Gaffin; Conners & Jett, 1999). Adolescents and adults who no longer meet the full criteria for ADHD, but who continue to experience some symptoms, should be diagnosed with ADHD, In Partial Remission (APA, 2000). Approximately, 20 percent of children with ADHD will continue to experience severe enough symptoms to warrant an ADHD diagnosis in adulthood (Allen, 1995). However, various other studies have suggested that this percentage is higher and from 30 to 70 percent (Brown & Cooke, 1995).

Adolescents with ADHD often present with difficulties similar to children with ADHD, such as difficulties staying seated, paying attention, and impulsivity (APA, 2000; Garber et al., 1997). Nonetheless, difficulties related to over activity tend to be less extreme in adolescents than in children (APA, 2000). Further, the behavioural difficulties experienced by adults with ADHD often differ from those of children and adolescents with the disorder. For example, adults with ADHD often change jobs frequently, and make impulsive decisions regarding money, travel, and relationships (Conners & Jett, 1999).

Without effective treatment, children with ADHD may face a bleak future. A large number of ADHD adolescents develop substance abuse disorders, and approximately 25 percent of adolescents with ADHD will drop out of high school (Mannuzza, Klein, Bessler,

Molloy, & LaPadula, 1993). As a consequence of school attrition, many of these young people will find it difficult to obtain well paid and high status positions in the workforce, and often will be forced to work in lower paid positions involving mundane and repetitive jobs – jobs which ADHD adults will often find difficult to succeed at (Conners & Jett, 1999).

1.8 Unresolved Diagnostic Issues

1.8.1 Are Inattentive and Hyperactive-Impulsive Subtypes Really Separate Disorders?

Factor analytic studies generally support the notion of the two main dimensions of ADHD – inattention and hyperactivity/impulsivity across primary-school (Gomez, Harvey, Quick, Scharer, & Harris, 1999; Wolraich, Hannah, Pinnock, Baumgaertel, & Brown, 1996), and pre-school children (Lahey et al., 1998). However, Neuman et al. (1999) showed that very few children experience hyperactivity/impulsivity with an absence of inattention, thus indicating the existence of only two of the three ADHD subtypes: predominately inattentive and combined types.

There are numerous differences between the dimensions of ADHD, including differences across age, gender, academic achievement, and intervention. Symptoms characteristic of the main dimensions of ADHD differ across the lifespan (Nolan, Gadow, & Sprafkin, 2001). Nolan and colleagues conducted a study to investigate, among other things, the prevalence of ADHD symptoms across 3,006 school-children aged between 3 and 18 years. These researchers reported that the hyperactive/impulsive subtype was much more common in younger children than in adolescents. It was also shown that very few pre-school aged children were diagnosed solely with inattentive difficulties (i.e., ADHD, Inattentive Type). However, difficulties with sustaining attention and concentration (i.e., Inattentive Type) were far more prevalent in adolescents than in younger children (Nolan et al.). Similarly, Robison, Sclar, Skaer, and Galin (1999) reported that while the hyperactive/impulsive symptoms often dissipate with age, it is not uncommon for children to continue to experience inattentive symptoms throughout adolescence and into adulthood. These findings point to the

possibility of a single ADHD disorder that changes as an individual develops. It might be that hyperactivity and impulsivity in children are early behavioural indicators for the development of inattention.

Discrepancies are also evident across the genders (Arnold, 1996; Biederman et al., 2002; Nolan et al., 2001). The inattentive subtype is diagnosed twice as often in girls than in boys (Biederman et al), and boys are far more commonly diagnosed with the hyperactive/impulsive subtype than are girls (Arnold; Biederman et al).

Academic achievement appears to be significantly lower in children with ADHD, predominately inattentive type, than in children with either ADHD, predominately hyperactive/impulsive-, or combined type (Marshall, Hynd, Handwerk, & Hall, 1997). Whilst the reason for this difference is not known, it may be that academic tasks require sustained mental effort – a skill that children with ADHD, predominately inattentive type, have much difficulty with, or there could be other factors associated with inattention, such as working memory, that these children have deficits in (McInnes, Humphries, Hogg-Johnson, & Tannock, 2003; Toplak, Rucklidge, Hetherington, John, & Tannock, 2003).

Interventions vary across the three ADHD subtypes, presumably because the symptoms characteristic of each subtype differs. It is assumed by many mental health professionals that a diagnostic label aids in the selection of an appropriate treatment. However, a diagnosis of ADHD *per se* does little to help the clinician with treatment options. Rather, a diagnosis of Hyperactive disorder or Inattentive disorder might better help clinicians decide upon appropriate intervention. Finally, when developing appropriate treatments the severity of the symptoms presented should also be taken into account (Neuman et al., 1999).

1.8.2 Duration of Symptoms

There is little research evidence to support the criterion that symptoms must persist for at least six months. Research has indicated that young children may remit within 12 months (Barkley, 1995), therefore indicating that prevalence rates may be artificially inflated.

Barkley's research indicates that 12-months or longer may be a more appropriate symptom duration requirement than the current 6-month criterion.

1. 9 Critiques of ADHD

1.9.1 ADHD is Not Really a Disorder

It has been suggested that ADHD does not exist, and that social and educational influences are at the core of children's behavioural difficulties (Armstrong, 1995). Further, Drummond (2000) argued that ADHD-related behaviours are common to *all* children and should therefore not be considered abnormal. Finally, the behaviour problems characteristic of ADHD have undergone numerous name changes in the past, and these name changes have often been accompanied by minor modifications to diagnostic criteria (APA, 1968, 1980, 1987, 1994, 2000). These diagnostic changes may have increased the possibility of children being diagnosed with the condition. However, research has shown that some children with ADHD can concentrate in some settings (e.g., at home), and DSM criteria were therefore changed to highlight this finding. Children can now be diagnosed with ADHD even if they can concentrate, pay attention, and stay seated for extended periods in some situations. (APA, 2000).

This change in DSM diagnostic criteria is problematic when one considers that children diagnosed with ADHD do not display their behavioural difficulties in a number of settings. For example, up to 80 percent of children with ADHD do not exhibit ADHD-related behaviours in the doctors's office (Armstrong, 1995), and children with ADHD are often able to remain seated and stay on-task when working in one-on-one situations, and in situations they find novel or interesting (Armstrong; Drummond, 2000). However, these findings may have arisen simply because they represent quite structured situations for the child, situations that are away from the child's normal situational realm, and thus become distractions to the child.

Another reason for children's differential concentration across settings might be related to nervous system stimulation, arousal and executive functioning. Mathias and Stanford (2003) showed that low levels of arousal are significantly related to impulsivity. Moreover, novel tasks provide greater stimulation to the nervous system (Aronson, Wilson, & Akert, 2004), and as a consequence children become more alert and are able to complete tasks. This hypothesis is in line with arousal theory which postulates that organisms have an optimal level of arousal to attain a positive performance (see Aronson et al.; Mathias & Stanford; Pliner & Loewen, 2002). This has important implications for children with ADHD—to increase the academic performance of children with ADHD; one should ensure that tasks set are novel. Barkley's (1998) theory of behavioural inhibition might also help explain differences in concentration levels across settings (see section 2.4.1 for further details of this theory).

1.9.2 ADHD is Often Misdiagnosed

ADHD is over-diagnosed according to numerous professionals (e.g., Allen, 1995; Orford, 1998). This belief seems warranted when one considers research showing that over 11 percent of Australian children now have a diagnosis of ADHD (Sawyer et al., 2001). According to Allen (1995), the number of children diagnosed with ADHD is highly unlikely and even absurd. He also purported that many of the problems associated with ADHD, such as unsociable behaviour, disruptive behaviour, and not paying attention, might simply stem from familial difficulties (i.e., conflict or lack of parenting skills) rather than from a neurologically-based disorder. This is not to say that familial difficulties *cause* children to develop ADHD, but rather, difficult childhood behaviours might better be attributed to family issues than to a disorder such as ADHD.

While it is difficult to prove whether or not ADHD is over-diagnosed, it has been well documented that the disorder is commonly misdiagnosed in children (Government of Western Australia, 2004; Kube et al., 2002). According to a recent Western Australian Parliamentary

Inquiry into ADHD, up to 75% of children diagnosed with ADHD have been misdiagnosed (Government of Western Australia). This high rate of misdiagnosis is likely to artificially inflate the prevalence estimates reported for the disorder. Children with developmental delays, learning difficulties, high functioning children with autistic spectrum disorders, and/or other psychological conditions, such as ODD and CD, anxiety, and depression, are the most likely to receive a misdiagnosis of ADHD (Allen, 1995; Government of Western Australia). A child with a specific learning disorder might *act out* in class as a means of masquerading his difficulties at school with the aim of not being labelled as abnormal or inferior. The behaviours engaged in to *hide* specific learning problems are often so similar to those behaviours characteristic of ADHD that learning disorders are often misdiagnosed as ADHD (Allen, 1995).

1.9.3 Conclusion

The current diagnostic criteria for ADHD have undergone rigorous development over the years. As a result, ADHD has become a well-researched and useful diagnosis. However, we do not have all the answers regarding ADHD. At present, there is no clear evidence regarding the aetiology of the disorder and misdiagnosis is quite common. Overall, despite the inherent difficulties in the current diagnosis of ADHD, the diagnosis is valuable, but further research is necessary to fully understand the condition.

1.10 Summary and Suggestions

Overall, this chapter has shown that the current diagnosis of ADHD involves three main subtypes; inattention, hyperactivity, and impulsivity, and has evolved since at least the late-1800s. There are two main classificatory systems currently used to diagnose childhood problems related to attention and overactivity: the DSM-IV-TR and the ICD-10. The reported prevalence of ADHD differs substantially across studies, but there is a general consensus that between three and five percent of children have ADHD. A high proportion of children with ADHD will continue to experience behavioural difficulties in adolescence, and some even

into adulthood, although the difficulties experienced appear to differ. Furthermore, comorbidity is extremely common in ADHD cases, particularly with learning difficulties, ODD, CD, depression and anxiety.

The evidence available is not sufficiently substantive to warrant changes to ADHD diagnostic criteria regarding number of subtypes (2 instead of 3) and symptom duration period (12-months instead of 6). Whilst there have been some early promising findings to suggest these amendments should be made to the DSM (e.g., Barkley, 1995; Neuman et al., 1999), there has not been enough systematic investigation into these. Therefore, further investigation is justified. It is suggested that future studies assess the symptom profiles of children, adolescents, and adults with ADHD, and assess these profiles across time, gender, academic achievement, and interventions.

Finally, two major critiques of ADHD were detailed; ADHD is not really a disorder and ADHD is often misdiagnosed. There is no doubt that the diagnosis of ADHD has changed over time. This should be considered in a positive light as it means that additional research and knowledge is now available about ADHD, meaning that diagnostic accuracy and treatment success will likely increase. Therefore, ADHD should be considered as a valid diagnosis that has undergone numerous improvements over time. There is strong evidence that ADHD is often misdiagnosed, particularly in Australia, thus suggesting that diagnostic training sessions be conducted by trained educators, for all professionals (e.g., general practitioners, paediatricians, psychologists and psychiatrists) who are able to diagnose the condition. It is important that these training sessions focus on diagnostic criteria, particularly that symptoms must appear across more than one setting, and that ADHD-related behaviours may be symptomatic of another childhood psychopathology.

CHAPTER 2: THE ASSESSMENT, AETIOLOGY AND TREATMENT OF ADHD

2.1 Overview

This chapter discusses the current assessment tools used to diagnose ADHD, including clinical interviews, medical assessments, intelligence and school-related assessments, behaviour rating scales, and ancillary tests and observational measures. Major limitations to these diagnostic tools are also covered. Psychological, environmental, and biological explanations regarding the aetiology of ADHD are then covered. The chapter concludes with a discussion of the psychological, biological, and alternative interventions used to treat the disorder, along with the limitations of each of these approaches.

2.2 The Assessment of ADHD

There is no one test that can accurately determine if a child has ADHD (Kidd, 2000), rather, there are a number of useful techniques that should be used for a thorough assessment and accurate diagnosis of the condition (American Academy of Child and Adolescent Psychiatry [AACAP], 1997). These techniques include clinical interviews, medical assessments, intelligence and school-related assessments, behaviour rating scales, and other tests and observational measures. To increase the reliability and validity of an assessment and any potential diagnoses, it is important that these techniques be used in conjunction with each other (Barkley, 1998).

2.2.1 *Clinical Interviews*

Clinical interviews are an invaluable tool in the assessment of psychiatric disorders, including ADHD (AACAP, 1997). With regard to ADHD, it is important that child, parent, and teacher interviews be conducted. Interviews are flexible, in that the focus can change to follow important points, possibly not thought of by the interviewer previously, and enable the interviewer to clarify answers and record details about the respondent's body language and other non-verbal messages (Sattler, 2002). Interview data may also shed light on the

interviewee's personality, temperament, lifestyle, and self-esteem (Sattler), which may be important when designing an individual treatment package.

Interviews with children are particularly useful because they can provide information about how the child feels, as well as the child's perceptions about their situation (Sattler, 2002). While a very important step in the assessment process, the information obtained from these interviews should be interpreted cautiously. For example, many young people are able to contain their overactivity or impulsiveness in a clinical setting (AACAP, 1997).

Details about the child's history should be collected from parents, including information about developmental milestones, illnesses, and operations experienced by the target child, as well as other family members. Information should be gathered about the child's behaviour from birth – relationships and play-patterns with siblings, other family members, and peers. Parents should also be asked to provide details about the structure and dynamics of the family, as well as information about how the parent(s), and other family members, respond to difficult behaviour exhibited by the target child (Holowenko, 1999).

Teachers should be asked to provide details about the child's behaviour at school, including their academic-related behaviour and their social and peer-related behaviour. For example, (i) is the child able to concentrate on set tasks, (ii) does the child listen to, and follow through on teacher's instructions, and (iii) is the child able to form and maintain peer friendships? Teachers should also be asked to provide details about interventions they have used in the past, and the teaching methods they use in the classroom (Holowenko, 1999).

Nowadays, it is very important that both parent and teacher interviews be conducted because the behavioural difficulties experienced by a target child need to occur in more than one environment (i.e., home and school) for a current valid diagnosis of ADHD (APA, 2000).

2.2.2 Limitations of Interviews

Whilst interviews provide rich and detailed information, they are subject to a number of disadvantages. First, reliability and validity may be difficult to establish as it is hard to

assess the accuracy of what informants say (Sattler, 2002). Second, interviewer bias might affect the accuracy of interview findings. That is, interviewees might respond to subtle, and often unintended, cues given by the interviewer, such as facial expressions, tone of voice, and posture (Sattler). For example, a smile by the interviewer might be seen by the informant as an indication that they are answering questions in the desired or anticipated manner, and future responses will likely mirror the previous responses.

2.2.3 Medical Assessments

A complete medical history should be sought to rule out any physiological problems which may be contributing to the behavioural difficulties, or which may hinder psychological intervention (Accardo, 1999). The medical assessment should gain information on the child's family (medical) background, events that occurred prior to, and during pregnancy, as well as a thorough developmental and medical history of the child (Hazell et al., 2000). Current information about the target child's health, and auditory and visual abilities should also be gathered (Garber et al., 1996; Holowenko, 1999). Children with thyroid problems, diabetes, allergies, and/or neurological disorders may engage in ADHD-like behaviours, such as being overactive and not paying attention (Garber et al.). Therefore, children should be assessed for each of these conditions. Finally, sleep difficulties are significantly more common in children with ADHD than in typically developing children, and may be associated with ADHD-related behaviours (Gruber et al., 2000; McLaughlin-Crabtree et al., 2003; Owens et al., 2000), which means that a child's sleeping patterns should also be investigated (Accardo).

2.2.4 Limitations of Medical Assessments

According to Sax (2000), it is very unlikely that doctors will complete a full medical history of children presenting with ADHD symptoms, possibly because of time constraints, or a lack of specific training necessary to thoroughly assess children for ADHD. The result of this lack of adequate assessment may mean that children are misdiagnosed with ADHD and subsequently unnecessarily prescribed stimulant medication (Sax).

2.2.5 Intelligence and School-Related Assessments

In addition to clinical interviews and medical assessments, a standardised intellectual assessment, such as the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV Wechsler, 2003), should be administered. As there is *no* evidence that ADHD children perform less successfully on intelligence tests than their non-disordered peers (Holowenko, 1999), the sole purpose of using the WISC-IV is to rule out the possibility that intellectual impairment is causing the child's behavioural difficulties. However, profile analyses have shown that children with ADHD often perform more poorly on the Freedom from Distractibility Index of the WISC than do their non-ADHD counterparts (Kaufman, 1994; Schwean & Saklofske, 1998).

Academic assessments should also be conducted to determine if the child has any specific learning difficulties, such as problems with reading, writing, comprehension, or mathematics. This is particularly important for three main reasons. First, learning difficulties have consistently been shown to co-exist with ADHD (e.g., Dykman & Ackerman, 1991; Tirosh et al., 1998). Second, children may disguise their learning difficulties by acting out in class (AACAP, 1997). Third, an accurate assessment of academic performance can greatly aid in the development of appropriate and beneficial programs for individuals with ADHD (AACAP).

Finally, school reports might be useful for an historical perspective on the child's school performance, including the child's academic strengths and weaknesses (Holowenko, 1999). A record of the child's school attendance might also be useful to consider in conjunction with the child's school reports (AACAP, 1997), in an effort to develop the best possible treatment for a child's behavioural and/or academic difficulties.

2.2.6 Limitations of Intelligence and School-Related Assessments

School-related assessments, such as school reports, might be perceived as subjective. However, there are a number of academic achievement tests that have adequate and well

tested norms. For example, the Australian federal government in collaboration with state and territory governments have developed national benchmarks to assess the literacy and numeracy of Australian children (Curriculum Corporation, 2004).

2.2.7 Behaviour Rating Scales

Standardised behaviour rating scales are very useful in the assessment of ADHD because they enable the behaviour of an individual child to be compared to a normative peer group (AACAP, 1997; Conners, 1998). These comparisons can help highlight abnormalities in a child's behaviour patterns in general, as well as in specific behaviours, such as listening, turn taking, staying seated, and completion of set tasks.

There are numerous rating scales available (see Barkley, 1998 or Sattler, 2002 for reviews). There are, however, only a small number of scales that are commonly used in psychological research and practice, and which have been well normed and validated for primary school-aged children. These scales include the Teacher's Report Form (Achenbach & Edelbrock, 1986a), both the teacher and parent versions of the Child Behavior Checklist (Achenbach, 1991; Achenbach & Edelbrock, 1986b) and the Conners Rating Scales (Conners, 1997).

Scales used to assess whether a child might have ADHD are typically checklists which ask parents and/or teachers to mark boxes to indicate the severity of the target child's behavioural difficulties (Reid & Maag, 1994). For example, the Conners Parent Rating Scale (CPRS), among other things, assesses ADHD by asking parents to place a tick in one of four boxes to indicate the degree of their child's behaviour problems for each of the items (Conners, 1997). One item, for example, presents parents with the statement, "Excitable, impulsive", and asks parents to select if their child behaves in this manner, Not at all, Just a little, Pretty much, or Very much (Conners). Whilst scales such as the CPRS provide some useful information about the severity of a child's behaviour problems, they do have some limitations.

2.2.8 Limitations of Behaviour Rating Scales

Behaviour rating scales essentially ask individuals for their beliefs about a child's behaviour pattern. These scales are therefore subjective in nature and their findings may be a reflection of the individual's beliefs and biases rather than a true indication of the psychological well-being of a child (Armstrong, 1995; Conners, 1998; Sattler, 2002). As suggested by Greene (1995), respondents often over- or under-estimate the occurrence of particular behaviours, inaccurately recall behaviours, and misinterpret rating scale items. It is therefore possible that the data collected from two people (e.g., parent and teacher) may highlight different difficulties being experienced by a child with ADHD. It is therefore important to (i) consider the informant's beliefs when analysing the data from rating scales, and (ii) compare the findings across informants, such as a child's teacher and parents. According to Sattler, data might be considered more accurate if the responses of the child's teacher *and* parents are similar.

Moreover, as alluded to above most behaviour rating scales ask respondents to indicate the severity of a number of behavioural difficulties for the target child. For example, the Conners Teacher Rating Scale (CTRS) presents teachers with four severity options; Not at all (0), Just a little (1), Pretty much (3), and Very much (4). Teachers are required to select a severity option (by ticking the appropriate box) for each of the 39 items (Conners, 1997). Unfortunately, scales such as the Conner's Scales (e.g., CPRS, CTRS), are unable to quantify the difference in clinical terms between children rated at the different *severity* levels. That is, there is no way of defining or distinguishing between a child rated as 3 as opposed to a child rated as 4. This therefore leads to the question of the usefulness of such instruments (Reid & Maag, 1994). Perhaps researchers and clinicians alike continue to use these instruments because there are no alternatives, or maybe their training has simply engrained in them the importance of assessing outcome via rating scales.

Finally, the misuse of scales is of some concern. Research has shown that professionals, particularly, paediatricians, often use rating scales as the sole measure of whether a child should be diagnosed with, and medicated for, ADHD (Sax, 2000). This is particularly troubling because ADHD-related behaviours often mask, or co-exist, with other conditions, such as learning disorders, depression, and anxiety, and these conditions are rarely identified when assessing children with *only* behaviour rating scales.

2.2.9 Ancillary Tests and Observational Measures

Besides behavioural rating scales, a number of other tests are often used when assessing a child for ADHD. For example, the Matching Familiar Figures Test (MFFT) and the Wisconsin Card Sort Test essentially aim to investigate impulsivity and the child's ability to remain focussed and on-task for an extended period of time (Brown & Cooke, 1995).

Observational measures usually involve the observation of behaviour for a specified period of time by a trained observer (Sattler, 2002). These observations can be made in either the laboratory or in a naturalistic setting. Obvious target behaviours to observe in a child being assessed for ADHD are those related to the specific DSM-IV-TR criteria, such as being out of seat and following instructions. However, it is the author's opinion that other important behaviours to observe might be communications between the child and his parents, and between the child and his teacher, as well as parental, teacher, and peer responses to a child's problematic behaviour. These behaviours are important to assess because of the impact they are likely to have on children's beliefs about themselves and on their subsequent behaviour.

2.2.10 Limitations of Ancillary Tests and Observational Measures

Whilst the tests previously mentioned provide an objective measure of a child's ability to remain on-task and correctly complete activities, they tend to represent activities that the child would not commonly engage in. With regard to observational measures, it has been well documented that an individual's behaviour changes when he knows he is being observed (e.g., Aronson et al., 2004; Salkind, 2003). Further, the expectancy bias suggests that people will

behave in a manner in which they believe will look positive, or in a way in which they believe the observer wishes them to act (Aronson et al., 2004).

There may be additional problems with these measures when trying to assess if a child has ADHD. First, ADHD symptoms are not always present when the child is engaged in highly structured or novel settings, or in an activity that they enjoy. Second, symptoms are often difficult to notice when the child is involved in a one-on-one situation, or when he is receiving frequent positive reinforcers (Dulcan et al., 1997).

2.3 Integration

While each of the techniques detailed above has limitations, the current philosophy on ADHD suggests that assessment for ADHD should be multi-modal in focus. That is, assessment should entail an integration of unique information collected by various professionals, including psychologists, teachers, and doctors, as well as parents and the child himself. The multi-modal approach is perceived by professionals to provide the best possibility of obtaining an accurate diagnosis of ADHD. Taken together, clinical interviews, medical assessments, intelligence and school-related assessments, behaviour rating scales, and other tests and observational measures provide one with rich details about the child's world, including his family and social environment, health, cognitive and academic capacities, social competency and behaviour. Given the current empirical literature, a valid conclusion regarding the most appropriate assessment tool for ADHD is difficult. At present, the multi-modal assessment appears to provide the best means of adequately assessing children for ADHD.

2.4 Aetiological Perspectives for ADHD

Although there have been numerous theories put forward to explain the aetiology of ADHD, the cause of ADHD remains unknown (Barkley, 1998; NHMRC, 1997). Currently, research indicates that ADHD is likely caused by a combination of factors. The three main

theories that have been postulated; psychological, environmental, and biological, will be discussed.

2.4.1 Psychological Theories

Barkley's (1997a,b) model of behavioural inhibition provides a good insight into the possible cause of ADHD. Barkley suggested that ADHD symptoms arise because of an executive functioning deficit in behavioural inhibition. This primary deficit causes a secondary dysfunction in nonverbal working memory and impaired motor control, which results in difficulties with self-regulation (Barkley, 1997a). According to Barkley (1997a,b) there are three main parts to behavioural inhibition; (i) inhibition of the prepotent (dominant) response, which creates a delay in responding (i.e., to reinforcement); (ii) difficulty with rendering interruptions as inappropriate or inaccurate given changes to task demands, and (iii) difficulty with responding to disruptions by competing demands. Children experiencing difficulties in these areas, in particular inhibition of the prepotent response, will exhibit ADHD symptoms (Barkley, 1997a,b).

Dysfunctional social environments, families, and school may also contribute to a child's difficulties with attention and overactivity (Holowenko, 1999). Society has changed dramatically over the past century (Sax, 2000). For example, the feminist movement and financial pressures have seen women return to the workforce in greater numbers after having children. As a result, it is now common for both mothers and fathers to work outside of the home, often on a full-time basis. Therefore, most parents, particularly mothers, tend to spend less time with their children than their parents spent with them.

Children learn, possibly through observation and modelling, that our lives are hectic and that we are expected to always be on the go (DeGrandpre, 2000). Furthermore, DeGrandpre argued that our everyday existence is bombarded with new sensory information. We hear, see, smell, touch, and taste things everyday. When a child sits down he may be bombarded with auditory and visual information such as the television, playstation, a CD or

DVD playing, a home or mobile telephone ringing, and a pager beeping. It has been suggested that we have become so accustomed to these new technological sensory experiences, that we have built up a tolerance to them, and now require even more sensory stimulation to feed our *sensory addictions* (DeGrandpre). For some children, these experiences may cause ADHD.

According to DeGrandpre (2000), sensory addiction means that a person is unable to cope with slowness, and similar to all addictions, children with sensory addictions will experience withdrawal symptoms. That is, when the bombardment of sensory stimuli is removed from a child the child will react with some withdrawal state. This is possibly what is occurring in the classroom. Sensory addicted children (and adults) find it extremely difficult to concentrate on tasks without additional sensory stimuli present, and thus may react by not following instructions, not completing set work, and being overly active. Furthermore, overactivity might also be seen as a means of the child trying to create his own sensory stimulation. It has been well documented that children *with* ADHD can remain engaged in activities that are novel and interesting to them (Armstrong, 1995; Drummond, 2000). It is possible that children perform well on new and interesting tasks because they are experiencing novel sensory stimulation and are thus feeding their sensory addictions.

There have also been changes in the ways in which children are disciplined and educated (Elkind, 1994). It was once the norm for children to play with friends in the backyard or on the street after school, on weekends, and during school holidays. Twenty years ago it was commonplace to see groups of neighbourhood children playing outside; laughing, skating, and riding their bikes. But nowadays, children's free time is often spent engaging in solitary activities, such as watching television, videos, and DVD's, playing electronic games, and surfing the internet (Sax, 2000). Given the limited exposure children now have engaging in social situations with their peers, it is not surprising that children *with* ADHD (and numerous others) have difficulty forming and maintaining friendships.

Finally, whilst it is known that society often produces labels to explain problems it seems that society is simply becoming intolerant of children's behaviour, and that minor problems tend to be automatically perceived as a symptom of some medical condition (Conrad & Potter, 2000).

2.4.2 Environmental Theories

High levels of lead and various pollutants have been shown to have an effect on children's behaviour (e.g., Crinnion, 2000; Kidd, 2000; Rapp, 1996; Tuthill, 1996). Tuthill examined the hair of 277 first-grade children in Massachusetts, and found that those with high levels of lead in their hair were significantly more likely to experience problems with attention and distractibility than those with low-lead levels. Moreover, a combination of lead and other metals, such as aluminium or cadmium, appear to have an even more deleterious effect on behaviour and cognitive ability (Schwartz, 1994). High levels of lead, aluminium, and cadmium are also commonly found in children with learning difficulties (Marlowe, Cossairt, Welch, & Errera, 1984), which may explain the high rate of comorbidity between ADHD and learning disorders (Kube et al., 2002).

Rapp (1996) indicated that pollution of our water, food, air, homes, and schools can help explain ADHD-related behaviours. For example, she suggested that overactivity and impulsivity are responses to high instances of dust, mould, and chemicals in the environment (Rapp). Considering that the brain of a child is still developing, it is more susceptible to environmental damage caused by toxins than is the brain of an adult (Tuormaa, 1994). If one was to accept the environmental aetiology suggestions, it makes sense that more children are diagnosed with ADHD than adults simply because their brain is more likely to be affected by chemicals.

2.4.3 Biological Theories

Pharmacotherapy, neurochemistry, brainwave analyses, biofeedback and genetic studies have provided some evidence that ADHD might be caused by biological mechanisms.

First, the effectiveness of stimulants in increasing children's ability to concentrate has been suggested as being an indicator that biology causes ADHD. In essence, it is argued that the aetiology of ADHD is biological in nature because medication works (Kidd, 2000). However, according to Nash (2000), whilst stimulants are somewhat effective in improving behaviour and attention, they have little effect on a child's academic performance. This finding may suggest that stimulants differentially affect systems within the brain. Second, imbalances in the neurotransmitters; dopamine, noradrenaline (norepinephrine), and serotonin, have been implicated as a causal factor in ADHD (Anderson & Cohen, 1996; Krause, Dresel, Krause, Fougere, & Ackenheil, 2003; Swanson, Castellanos, Murias, Lattoste, & Kennedy, 1998; Quist & Kennedy, 2001). However, research has failed to identify which of these neurotransmitters is responsible for ADHD-related difficulties (Widener, 1998). There is some evidence that children with ADHD have lower dopamine levels than their non-ADHD counterparts (Barkley, 1998), and this is consistent with the beneficial effects of using stimulants as a treatment for ADHD (Anderson & Cohen). Further, research has consistently shown a strong association between ADHD and two dopaminergic systems; the dopamine transporter system and the D4 receptor (e.g., Sunohara et al., 2000; Swanson et al.).

However, the effectiveness of other drugs for treating ADHD, such as clonidine and desipramine, suggest that noradrenaline might be partly responsible for the symptoms of ADHD (Anderson & Cohen, 1996). Similarly, Quist and Kennedy (2001) suggested that serotonin can also be partially implicated as a cause of ADHD, given the findings that serotonin is related to disinhibition and children with ADHD experience many difficulties with behavioural inhibition (Barkley, 1998). Whilst Quist and Kennedy agreed that dopamine is likely to be a causal factor in ADHD, they argued that there is probably a strong interaction between dopaminergic and serotonergic systems in ADHD symptomatology.

It is unlikely that only one neurotransmitter system is responsible for all of the symptoms associated with ADHD. Quist and Kennedy (2001) stated that different

neurotransmitters might be responsible for the different features of ADHD (hyperactivity, impulsivity, and inattention), and suggested the possibility that three separate diagnoses would flow from this notion. Furthermore, it has also been suggested that interactions between different levels of neurotransmitters may better explain the behavioural difficulties noted in ADHD (Kelland & Chiodo, 1996; Quist & Kennedy). It might be that one neurotransmitter system is the primary causal factor in ADHD, and that secondary problems arise in the other two systems. At present, these are only hypotheses, and therefore require significant further investigation before one can strongly argue for the existence of separate diagnoses. Finally, it has been argued that the stimulants and tricyclic anti-depressants used in the treatment of ADHD might act on serotonin levels, which in turn affects dopamine (and noradrenaline), and the consequence of this interaction being changes in ADHD-related behaviours (Quist & Kennedy).

Unfortunately, neurochemistry cannot be viewed as a diagnostic tool with regard to ADHD. Research has provided inconsistent results regarding neurotransmitter levels across ADHD and non-ADHD children (Levy, Barr, & Sunohara, 1998). For example, while low levels of dopamine have been noted in children with ADHD, they have also been recorded for non-ADHD children. Similarly, high levels of dopamine have been noted in both ADHD and non-ADHD children (Levy et al.). Similar discrepancies have been noted for serotonin (Quist & Kennedy, 2001).

Brainwave activity research via the use of electroencephalogram (EEG) technology has also shed some light on the aetiology of ADHD. Nash (2000) argued that slow brainwave activity might help explain ADHD-related difficulties. He indicated that slow theta and alpha waves in the frontal lobe are often evidenced in children with ADHD, combined type. Whereas children with ADHD, predominately inattentive type, appear to have slower than average theta and alpha waves in the parietal lobes (Nash). Findings such as this have led to the use of biofeedback to treat ADHD.

Finally, although ADHD is not caused by chromosomal abnormalities (Barkley, 1998), there is strong support that ADHD has an inherited component (Barkley; Faraone & Biederman, 1998; Mercuglino, 1999; Todd, 2000). According to Barkley, offspring of parents with ADHD have a 57% chance of being diagnosed with ADHD, and a sibling of a child diagnosed with ADHD has a 32% chance of also being diagnosed.

Overall, after more than 100 years of speculating that hyperactivity and inattention are the result of some brain abnormality, there remains no clear-cut scientific evidence that ADHD is a medical disease caused by some biological property (DeGrandpre, 2000). Regardless of the lack of specificity of the scientific evidence available, there is a firmly held belief in the medical community that ADHD is a medical condition caused by a dysfunction in the brain, and consequently, the best possible treatment is medication (Kidd, 2000; Kewley & Latham, 2000). Whilst stimulants and other biological treatments certainly have their place within the treatment of ADHD, biological interventions are often used to the neglect of the psychological and environmental approaches available (Kidd).

2.5 The Treatment of ADHD

Just as a multi-modal approach is recommended for the assessment of ADHD, a combination of treatment options is arguably the best intervention for individuals diagnosed with ADHD (Cooper, 1997; Dulcan et al., 1997; Jensen, 2001; Kidd, 2000; NHMRC, 1997; Taylor, 1997). The treatment options available for ADHD can be grouped into three main categories; psychological, biological, and alternative.

2.5.1 *Psychological Approaches*

Psychological treatments for ADHD have been used for almost 50 years (O'Leary, Pelham, Rosenbaum, & Price, 1976), and research has generally shown them to be efficacious in the treatment of the disorder (Chambless & Ollendick, 2001; Hazell et al., 2000; Pelham Jr. et al., 1998). In particular, behavioural parent training and classroom behaviour modification have well-established empirical support (Chambless & Ollendick), as do behavioural

classroom interventions such as reinforcement, punishment, and planned ignoring (Hazell et al., 2000; Pelham Jr. et al.). Like parents, teachers can successfully use these strategies to manage the behaviour of children with ADHD. Behavioural classroom interventions can be separated into three main categories; cognitive-behavioural (CB) interventions, contingency management (CM), and intensive packaged behavioural treatments.

Verbal self-instructions, problem-solving training, cognitive modelling, self-monitoring, and reinforcement, are all examples of CB treatments (Pelham Jr., Wheeler, & Chronis, 1998). A typical CB intervention lasts for several weekly sessions, and involves a therapist teaching the individual appropriate ways of managing behaviour problems by understanding the links between thoughts and actions (Pelham Jr et al.).

Whilst most research has indicated that CB interventions are efficacious for children with ADHD (Chambless & Ollendick, 2001; Conners & Jett, 1999; Hinshaw & Erhardt, 1991), there is evidence that these strategies do not always provide clinically significant improvement to children's ADHD symptoms or academic performance (DuPaul & Eckert, 1997, 1998; Pelham Jr. et al., 1998). Research has suggested that social skills training, problem-solving training, and peer tutoring, appear to have greater clinical efficacy than standard CB interventions that are less practical in nature (DuPaul, Ervin, Hook, & McGoe, 1998; Pelham Jr. et al.; Pfiffner & McBurnett, 1997), particularly in helping children with ADHD form and maintain friendships with their peers (Cipkala-Gaffin, 1998). Pfiffner and McBurnett assessed the effectiveness of social skills training (SST) for 27 children with ADHD. They found that SST aided in a reduction of problem behaviour and produced a significant improvement in social knowledge, which was evidenced by both teacher and parent reports. These gains remained at the four-month follow-up.

CM strategies are more labour intensive than CB interventions and are more effective as well (Pelham Jr. et al., 1998). Whilst the techniques used in CM and CB interventions are identical, the setting for training differs across these two categories. In CB treatments,

professionals tend to hold sessions in an office, where strategies are taught to all involved. In contrast, CM sessions are held in the setting in which the problematic behaviours occur. For example, educational strategies are taught in the classroom, and parent training is conducted in the family home.

Intensive psychosocial treatment programs are particularly useful to help children with ADHD perform better socially (Pelham Jr. et al., 1998). These programs are generally run over a school holiday break (e.g., summer holidays) and involve full day activities. For example, Pelham and Hoza (1996) ran an 8-week (9-hour per day) Summer Treatment Program for children with ADHD. The program involved the use of behavioural and CB strategies and focussed predominately on improving problematic peer relationships. Post-program results suggested that intensive interventions were more effective than traditional CB techniques in terms of improved peer relationships (Pelham & Hoza).

2.5.2 Limitations of Psychological Approaches

Psychological treatments are not effective for all children (Frazier & Merrell, 1997). Furthermore, while these strategies have been shown to be partly efficacious in the short-term management of behavioural symptoms, there have been very few studies investigating the long term impact of engaging in behaviour therapy (Pelham Jr. et al., 1998). Therefore, the long-term effectiveness of psychological treatment is unknown at present.

Whilst intensive psychosocial treatment programs appear to be the most efficacious of all psychological treatments available, these programs have yet to be assessed experimentally. That is, studies that have assessed intensive programs have neither used control groups as a means of comparison, nor have they used randomised samples (Pelham Jr. et al., 1998). Finally, although psychological interventions are somewhat effective in treating problems associated with ADHD (particularly improving peer relationships), they can be quite time-consuming and expensive (Atkinson, Robinson, & Shute, 1997; NHMRC, 1997), especially when compared to the short-term costs associated with medication (Pelham Jr. et al.).

2.5.3 *Biological Approaches*

Biological approaches are by far the most commonly utilised intervention for ADHD (Pelham Jr. et al., 1998), with psychostimulant medication being the most common form of biological treatment (Hoagwood, Kelleher, Feil, & Comer, 2000; Kidd, 2000; Robison et al., 1999). In Australia, 60 to 90% of children diagnosed with ADHD will be prescribed stimulant medication (Bridge & Lennard, 2004). Methylphenidate and dextroamphetamine are the most commonly prescribed stimulants (DeGrandpre; 2000; Safer & Malever, 2000), although various other medications, such as pemoline and modafinil, are gaining prominence in the treatment of ADHD (Fox & Reider, 1993; Rugino & Copley, 2001).

The use of stimulants has rapidly increased over the past three decades in Australia and the United States (US) and to a lesser extent in the United Kingdom (UK) (Appleyard, 2004; Gibbs, 1999; Reid, Hakendore, & Prosser, 2002; Sax, 2000). There are state differences across Australia in terms of the number of children medicated with stimulants (Prosser & Reid, 1999; Safer & Malever, 2000). For example, in 2001 the annual rate of dextroamphetamine usage in Western Australia was 3.6 million prescriptions, 3 million in New South Wales, and approximately 3 million in Victoria and Queensland combined (Alberici, 2001). It makes intuitive sense that the number of children medicated would be higher in regions where there are greater numbers of children diagnosed with ADHD. However, there are no clear reasons why there are a significantly greater number of prescriptions written in Western Australia compared to other Australian jurisdictions, or between Australia, the US, and the UK.

A possible reason for the lower number of children medicated in the UK might be the classificatory systems used. As noted previously, the ICD-10 (WHO, 1992) is used in the UK, whereas, the DSM-IV-TR (APA, 2000) is predominately used in Australia and the US. The ICD is a more stringent test of ADHD than is the DSM. Children with co-morbid conditions are not diagnosed with ADHD under ICD-10 criteria, whereas children can have multiple co-

morbid diagnoses under the DSM system (APA, 2000; WHO, 1992). Therefore, it makes sense that lower numbers of children will be diagnosed with ADHD (and medicated for) in the UK, simply as a result of it being more difficult to receive a singular diagnosis of ADHD using the ICD than the DSM.

2.5.4 Limitations of Using Stimulants

Stimulants do not cure ADHD, rather they act as a *band-aid*, often covering the underlying difficulties that may help understand or explain a child's behavioural problems (Anonymous, 2000; DeGrandpre, 2000; Pelham Jr. et al., 1998). Once medication is withdrawn from a child their social, familial, and/or psychological problems will remain (Conners & Jett, 1999). Furthermore, there is no evidence to suggest that stimulants aid children's social or cognitive capacities in the long-term (Tannock & Martinussen, 2001). Medication does not help children with ADHD in the two fundamental problematic areas – medication neither teaches children how to sit still, pay attention, or follow instructions, nor does it aid in the formation and maintenance of friendships with peers (Garber et al., 1996).

Second, stimulant effectiveness is not synonymous with ADHD status. Stimulants do not *help* all children with ADHD (Allen, 1995; Pelham, Walker, Sturges, & Hoza, 1989). Approximately 20 to 30 percent of children with ADHD do not respond to medication (DuPaul & Eckert, 1997). About 50% of children medicated will experience some positive effect on academic performance, while the remaining 50% will show no improvement or deterioration in this area (Rapport, Denney, DuPaul, & Gardner, 1994). Further, research has indicated that stimulants have the same effect on *all* children – not only those diagnosed with ADHD (DeGrandpre, 2000; Rapoport et al., 1978; Whalen & Henker, 1992). That is, the likelihood of stimulants being effective in increasing children's ability to pay attention, is equally likely in both ADHD and non-ADHD children.

It is unknown why these drugs actually *work* (Concar, 2002; Kimko, Cross, & Abernethy, 1999). According to Novartis Pharmaceuticals, the maker of the stimulant *Ritalin*

(methylphenidate), the use of Ritalin is not fully understood (Medical Economic Company, 1996). It is believed that stimulants act on the neurotransmitters in the brain responsible for behaviour (AACAP, 2002; Anderson & Cohen, 1996; Swanson, Castellanos, Murias, LaHoste, & Kennedy, 1998; Quist & Kennedy, 2001). However, research has neither provided reliable evidence regarding which neurotransmitters are responsible for ADHD, nor the exact effect stimulants have on them (Concar). For example, it has been suggested that stimulants work by blocking the reuptake of dopamine, or by helping release greater amounts of this neurotransmitter (AACAP, 2002). Nonetheless, research has struggled to clearly identify whether too much or too little dopamine is responsible for ADHD. Furthermore, it has also been argued that norepinephrine may be involved in ADHD (Kimko, et al., 1999; Solanto, 1998). Overall, whilst the medical community are not definitive on the workings of stimulant medication, stimulants have been used for many years as a pertinent treatment for overactivity in children (Pelham Jr. et al., 1998).

There is no conclusive evidence regarding the long-term effects of using stimulants (Kimko et al., 1999; Pelham Jr. et al., 1998; Sax, 2000). It has yet to be determined whether long-term use of these drugs affects brain or physical development, increases the risks of psychopathology later in life, or helps users create a mentality that one must be medicated to succeed in life. Of concern are preliminary studies with mice indicting that the long-term use of Ritalin can cause liver cancer (McLearn, 1996).

Finally, side-effects are commonly experienced by children taking stimulants. According to Alberici (2001) recent research has shown that between 25 and 51 percent of children medicated with stimulants will experience side effects. These effects include changes in mood, insomnia, loss of appetite, stomach-ache, headache, and tic-like movements (Allen, 1995, Barkley, McMurray, Edelbrock, & Robbins, 1990; Brown & Cooke, 1995; Fox & Reider, 1993; Garber et al., 1996). Some children (approximately 10%) have severe side effects and become withdrawn, tearful and irritable (Allen, 1995; Brown & Cooke).

Furthermore, children medicated with stimulants (particularly Dexamphetamine) for longer than two years may also experience growth suppression (Brown & Cooke). However, growth usually returns to normal levels upon cessation of the medication (Garber et al.).

Research comparing side-effects of a stimulant and a placebo condition showed that the apparent *side-effects* of stimulants may actually be symptoms of ADHD itself (Barkley, McMurray et al., 1990). Barkley and colleagues conducted a double-blind, cross-over evaluation of two levels of methylphenidate (0.3 and 0.5 mg/kg) and a placebo for 83 children diagnosed with ADHD. Parents and teachers were asked to rate the frequency and severity of each of 17 common side effects at the end of each weekly drug condition (0.3, 0.5 mg/kg, and placebo). Barkley, McMurray et al. found that according to parental reports only 4 of the 17 symptoms (decreased appetite, insomnia, stomach-ache, headache) increased in frequency and severity during the drug conditions compared to the placebo condition. Furthermore, it was reported that some apparent adverse effects of using stimulants actually lessen as a result of using the medication. For example, according to teacher reports children are less anxious, less sad, and do not stare or day-dream as often when they are medicated (Barkley, McMurray et al.).

2.5.5 Other Pharmacological Approaches

Anti-depressants. Anti-depressants are the treatment of choice for children with ADHD who do not respond to, or experience severe side effects from, stimulants (Brown & Cooke, 1995; Fox & Reider, 1993; Zoler, 2001). It is estimated that 68 to 83% of children with ADHD will respond to tricyclic anti-depressants, such as imipramine (Tofranil) and desipramine (Pertofran) (Brown & Cooke). However, when Garfinkel, Wender, Sloman, and O'Neill (1983), compared the effectiveness of methylphenidate and two anti-depressants (clomipramine and desipramine), for 12 children with severe ADD, they found that while anti-depressants were superior to methylphenidate in reducing depressive symptoms and low-

levels of self-esteem, they were not as effective as stimulants in the treatment of inattention and overactivity (Garfinkel et al.).

Like stimulants, there are a number of side effects associated with the use of anti-depressants, including drowsiness, fatigue, weight gain, irritability, constipation, nausea, dry mouth, and increases in blood pressure and heart rate (Brown & Cooke, 1995; Fox & Reider, 1993). There have even been cases of children dying as a result of using anti-depressants, and it has been suggested that children should not be prescribed such medication (Brown & Cooke).

Clonidine. Clonidine (Cataprese), a medication most commonly used to treat high blood pressure and sleep difficulties, is increasingly being used in the treatment of ADHD (Allen, 1995; Fox & Reider, 1993). The drug appears to be effective for children who do not respond to, or experience severe side effects from, stimulants (Fox & Reider), and also for those who present with co-morbid aggression (Hunt, Capper, O'Connell, 1990).

2.5.6 *Alternative Approaches*

Dietary therapy. Diet and nutrition are important to one's mood and behaviour, as well as to neuronal development (Baumgaertel, 1999). Based on clinical experience, Feingold (1975) argued that food additives and salicylates were responsible for behavioural problems in over half of all children with what is now known as ADHD, and subsequently, the behaviour of these children could be improved if they refrained from eating foods that contained artificial flavours, colours, preservatives, and salicylates. This conjecture was tested some years later by Wender (1986), who found that only one percent of the sample showed consistent behavioural improvement with dietary changes. Moreover, recent research supports these substantially lower figures (Schardt, 2000), and suggests that dietary therapy is not a reliable or valid treatment for ADHD in general (Dengate, 1997; Faraone & Biederman, 1998; Pelham Jr. et al., 1998; Perry, Dwyer, Gelfand, Couris, & McCloskey, 1996).

There are some findings though suggesting that individualised diets can be effective in reducing ADHD related behaviour problems (e.g., Baumgaertel, 1999; Boris & Mendel, 1994; Brue & Oakland, 2002; Kosub, 2003). For example, Kosub showed that children's behaviour was improved by eliminating "junk food" from their diet. Overall then the findings regarding dietary therapy and ADHD are mixed, and at present there is no firm evidence for or against altering the diet of a child with ADHD in an attempt to improve problematic behaviour.

Vitamin-mineral supplements. Research has shown that nutrient deficits can impair brain function and affect behaviour (e.g., Baumgaertel, 1999; Kidd, 2000). Given these findings, various suggestions have been made regarding the efficacy of vitamin-mineral supplements. For example, vitamins A, E, B12, and B6, have been shown to help decrease activity levels in children with ADHD (Kidd). Furthermore, iron, magnesium, and zinc have also been shown to be an effective means of treating overactivity in children (Brue & Oakland, 2002; Kidd). However, investigations into the effect dietary supplements have on children with ADHD show only minor effects on ADHD symptoms (Brue & Oakland).

Essential fatty acids. Like diet and dietary supplements, essential fatty acids (EFA) are vital to brain and neuron development and function (Baumgaertel, 1999). EFA treatment involves a child orally ingesting a tablet or capsule and there is some evidence that it is effective in reducing problematic behaviours in children with ADHD (Richardson & Puri, 2000). According to Richardson and Puri, while the benefits of EFA treatment can take up to three months to be seen, it is a relatively safe alternative to stimulant medication. Whilst some limited research has been conducted on the affect EFA has on ADHD (Richardson & Puri), the results remain inconclusive (Baumgaertel).

Biofeedback. Biofeedback (or neurotherapy) is a strategy that utilises the finding that children with ADHD have slower alpha and theta frequencies than do typically developing children (DuPaul & Stoner, 2003; Rabiner, 2001). The technique itself involves placing electrodes on the child's head, which are connected to an EEG machine in an attempt to

record brainwave activity. The child is then instructed to perform a particular task (e.g., play a computer game), and is given feedback regarding the type of brainwave activity detected. Various relaxation techniques are also used as a means of teaching a child to control (ie., increase the frequency) their brainwave activity (DuPaul & Stoner; Lefton, 2000). Most biofeedback interventions involve 30 weekly or bi-weekly sessions (Baumgaertel, 1999). Biofeedback is becoming increasingly popular for treating ADHD (Baumgaertel), which is not surprising in light of research showing its effectiveness in increasing the attention, impulse control, speed of information processing, and academic performance of children with ADHD, as well as decreasing problematic behaviour (Nash, 2000; Rabiner; Thompson & Thompson, 1998). According to Brue and Oakland (2002), ADHD symptoms will not be reduced in approximately 15 percent of children treated with biofeedback. Further, because it is a relatively new treatment for ADHD, there is currently little literature on the long-term effects of biofeedback (Brue & Oakland).

2.6 Integration

It has been shown that there are different options available to treat ADHD. Behaviour parent training and classroom behaviour modification are two psychological interventions that have some scientific and empirical support for the effective treatment of ADHD. However, biological approaches are by far the most commonly used treatment for ADHD. Whilst stimulants can be quite effective in the short-term treatment of ADHD, their mechanism of action is not fully understood and the long-term impact they have on children has yet to be investigated. Alternative treatments, such as dietary therapy, vitamin-mineral supplements, EFA, and biofeedback, have been shown to have some efficacy with regard to treating hyperactivity in children. Overall, the best intervention for a child with ADHD is an individualised treatment plan encompassing different treatment types. This treatment approach may be referred to as a biopsychosocial approach to the treatment of ADHD.

2.7 Summary and Suggestions

Overall, there are a variety of assessment tools available to aid in the accurate diagnosis of ADHD, including clinical interviews, medical assessments, intelligence and school-related assessments, behaviour rating scales, and ancillary tests and observational measures. While each of these assessments is important to a thorough investigation of suspected-ADHD, they all have disadvantages. Therefore, it is suggested that a thorough assessment of ADHD use a combination of these tools. As ADHD symptomatology often initially appears when children enter primary school (APA, 2000), it is imperative to assess teachers' perceptions and experiences of the child's behaviour. Teachers spend a considerable amount of time with children during the school-week and therefore have a substantial contribution to make regarding the assessment of children suspected as having ADHD.

Further, whilst the aetiology of ADHD is not clearly understood, there have been a number of plausible suggestions regarding the psychological, environmental, and biological causes of ADHD. To date, no conclusive evidence exists regarding a singular cause for the condition, but research indicates that ADHD is likely caused by a combination of factors. Given this, additional research is required to accurately specify the causal mechanisms involved in ADHD. Finally, the three main treatment options for ADHD, psychological, biological, and alternative, have their own advantages and disadvantages. The most efficacious intervention for ADHD therefore is most likely to involve an individualised combination of treatment options, that is, a biopsychosocial approach. However, it is important that the invaluable contribution teachers can make to the assessment and treatment of ADHD be understood. It is therefore recommended that teachers be involved in both the assessment and treatment of ADHD.

CHAPTER 3: ADHD RESEARCH IN EDUCATIONAL SETTINGS AND RATIONALE FOR CURRENT STUDIES

3.1 Overview

The classroom may represent one of the most difficult places for children with ADHD, most probably because this setting requires children to engage in behaviours that are contrary to the core symptoms of the disorder. Much research has been conducted involving children's behaviour problems within educational settings, and this chapter will provide a detailed description and analysis of the literature in this area. The chapter is divided into three parts. The first focuses on the difficulties experienced by students with ADHD, including academic difficulties (e.g., poor academic performance, being kept down, suspension, and expulsion), and problems forming and maintaining peer relationships. The second section describes research pertaining to teachers and students with ADHD. Literature concerning teachers' knowledge and attitudes is reviewed, as are studies addressing teachers' classroom management of children with the condition. The final part of the chapter provides a summary of the literature, as well as suggestions for future research into ADHD and the education system.

3.2 Difficulties Experienced by Students with ADHD

Research has generally focussed on the academic and social difficulties students with ADHD experience within educational settings (e.g., Barkley, Fischer, Edelbrock, & Smallish, 1990; DuPaul & Eckert, 1997, 1998). This research has shown that children with ADHD often experience a myriad of difficulties at school related to the core symptoms of the disorder, inattention, impulsivity, and overactivity. However, there may be gender differences regarding the severity of these problems. For example, Abikoff et al. (2002) showed that whilst boys with ADHD show significant behavioural problems in the classroom, girls with the disorder generally behave in a comparable manner to typically developing children.

In addition, or possibly as a result of ADHD-related problems, children with ADHD frequently experience lowered academic performance, are kept down, or are suspended or

expelled from school (APA, 2000; Marshall et al., 1997; Pfiffner & Barkley, 1990). A child with ADHD may exhibit various behaviour problems within the classroom which are dependant on their ADHD symptom profile. For example, a child with inattentive symptoms might have difficulty following teacher instructions and rules, staying on task and completing set work (Pfiffner & Barkley). Whereas, a child experiencing impulsivity might call out in class without permission or talk with other students at inappropriate times. Finally, an overactive child might have problems staying seated, playing with objects not related to the set task (e.g., playing with a pencil when instructed to read silently), rocking in chairs, and repetitively tapping their hands or feet (DuPaul & Stoner, 2003). Most children with ADHD, however, exhibit behaviour problems related to *at least* two of these three core symptoms (APA, 2000).

Given these behaviours, it is not surprising that these children have a lot of trouble at school (Pfiffner & Barkley, 1990). The academic performance of students with ADHD is often compromised because of their difficulties with sustaining attention (DuPaul & Stoner, 2003). Students with ADHD usually find it difficult to concentrate long enough to complete set tasks. Students' academic performance may further be impaired by an inherent tendency to be disorganised – to misplace books, stationary and other materials they need to complete their school work (APA, 2000; DuPaul & Stoner). Moreover, being overactive and impulsive in the classroom can mean that the student with ADHD is not paying attention to the task at hand, and this may result in the child misunderstanding what is required to complete that task, and subsequent failure to satisfactorily complete it. Luckily however, the behavioural difficulties observed in children with ADHD can often be reduced when novel and interesting tasks are presented, especially when the task is easy or repetitive (Greene, 1995; Zentall, 1993), and when the tasks are presented to the child at a level they understand (DuPaul & Power, 2000).

ADHD-related behaviours are disruptive in the classroom (Pfiffner & Barkley, 1990), not only to teachers, but also to other students (DuPaul & Stoner, 2003). This may be one of the reasons ADHD children have such a difficult time forming and maintaining friendships with peers (Barkley, 1998). Research has consistently shown that children with ADHD tend to have a lot of difficulty with peer relationships (e.g., Barkley, 1998; Erhardt & Hinshaw, 1994; Gresham et al., 1998; Hinshaw & Melnick, 1995; Pfiffner & McBurnett, 1997). According to Gresham and colleagues, up to 70% of children with ADHD experience unreciprocated friendships with peers. Furthermore, typically developing children report not wanting to befriend their peers with ADHD (Wheeler & Carlson, 1994), particularly those who experience difficulties with overactivity (Jenkins & Batgidou, 2003).

There are a number of possible reasons for ADHD children's difficulty with peers. It may be that children with ADHD tend to perform behaviours considered controlling, trouble making and aggressive (Erhardt & Hinshaw, 1994; Hinshaw & Melnick, 1995). These behaviours are likely to be perceived by peers as negative, and thus prompt rejection from play activities. Second, children with ADHD may have difficulty reading social cues from their peers, and respond inappropriately as a result (Atkinson et al., 1997). Children with ADHD are not purposefully nasty. In fact, these children often have low self-esteem (Wheeler & Carlson, 1994), report feeling lonely and sad about not being liked by their peers, and desperately want to *fit in* (Cipkala-Gaffin, 1998; Gresham et al., 1998). Finally, research has also suggested that teachers' attitudes and behaviour toward a student with ADHD can impact on other students' perceptions of that child (Atkinson et al., 1997).

3.3 Teachers and Students with ADHD

Whilst teachers are concerned about the social difficulties experienced by students with ADHD, they tend to be most concerned with problematic behaviours involving control, discipline, achievement, and listening to and complying with instructions (Kauffman, Lloyd, & McGee, 1989). Further, Li (1985) showed that there is a general perception by teachers that

acting-out behaviours are significantly more problematic than withdrawn behaviours. This finding might be the result of withdrawn behaviours being less disruptive to the classroom environment than overt problem behaviours, or teachers' beliefs that internalising problems have a far better prognosis than externalising childhood problems (DeStefano, Gesten, & Cowen, 1977).

Teachers tend to perceive children with ADHD as requiring extra teaching time and effort (Atkinson et al., 1997). This perception seems to be a true reflection of reality. Teachers have been shown to modify their teaching as a result of having a student with ADHD in their class—they provide greater structure and routine in their classes and prepare work in greater detail for all students when they have such a student (Atkinson et al.).

Given the nature and frequency of the negative behaviours exhibited by students with ADHD, it is not surprising that teachers often feel pessimistic about teaching children with the condition (Kauffman et al., 1989). While teachers might be pessimistic, they generally perceive themselves as being competent to handle these difficulties in the classroom. Kauffman and colleagues asked 77 primary and secondary school teachers to complete a 30-minute questionnaire assessing demographic details and teachers' beliefs about adaptive and maladaptive classroom behaviours. Usable data were collected for 61 teachers. The results showed that most teachers felt that they were capable of both teaching students critical skills such as listening and following classroom rules, and also in managing unacceptable behaviours in the classroom such as stealing and tantrums. However, this was a select sample of teachers. The sample was derived from teachers enrolled in an in-service course in behaviour management. Therefore, it is likely that these teachers' were not representative of *typical* teachers

Research has also indicated that teachers' attitudes are mediated by their perceptions of competence (Brophy & McCaslin, 1992; Li, 1985; Rizzo & Vispoel, 1991). Rizzo and Vispoel asked 94 physical education teachers to rate their attitude and perceived competence

regarding teaching students with disabilities. They reported that the more competent a teacher felt, the more favourable their attitudes were regarding teaching these students. Moreover, whilst training and attitudes were not related, there was a significant positive correlation between perceived competence and years of teaching experience. Further, teachers who had previously taught a student with ADHD were generally more confident in their ability to teach students with ADHD than were teachers without this experience (Reid, Maag, Vasa, & Wright, 1994). Reid and colleagues also showed that lack of training, time, class size, and severity of student behaviour problems were the most troublesome issues to teacher's management of ADHD within the classroom.

3.4 Teachers' Knowledge and Attitudes Regarding ADHD

ADHD most often presents in the early school years, and is quite pervasive across the education system, with an average of one child per classroom having the disorder (Barkley, 1998). The disorder is most commonly diagnosed in the first few years of school as children are expected to behave in ways that are contrary to the core symptoms of the disorder; such as staying seated, paying attention, and following teacher instructions (Barkley). Therefore, primary school teachers are very likely to be one of the first people to notice ADHD-related behaviours in children (Tannock & Martinusen, 2001).

Numerous studies have been conducted in relation to the assessment (e.g., Greenhill, 1998), treatment (e.g., Brown & Ievers, 1999), and aetiology of the disorder (e.g., Levy et al. 1998). There is also an abundance of literature detailing the high rates of comorbidity between ADHD and other disorders (e.g., Jensen, Martin, & Cantwell, 1997), and the problems children with ADHD face academically and socially (Barkley, Fischer et al., 1990; DuPaul & Eckert, 1997, 1998). However, very little research has thoroughly assessed the educators of these students. Only three studies that the writer is aware of have adequately assessed teachers' knowledge of ADHD and the relationships between teacher characteristics and their

knowledge of the disorder. Even fewer studies have adequately assessed teachers' attitudes toward ADHD.

Over the past 10 years, three North American papers have been published which assessed teachers' ADHD knowledge (Barbarese & Olsen, 1998; Jerome, Gordon, & Hustler, 1994; Sciutto, Terjesen, & Bender-Frank, 2000), and there are no Australian studies published that the author is aware of. The dearth of literature in this area is a surprise considering that a common source of information for parents of children with ADHD is the school system (Bussing, Schoenberg, & Perwien, 1998), and that teachers often provide inaccurate advice to parents which they frequently follow (DiBattista & Shepherd, 1993). Furthermore, not only is there a scarcity of data, the results of these three studies have been mixed. First, the average knowledge scores of in-service teachers as assessed by the proportion of questions correctly answered, have differed across studies. Jerome et al. (1994) and Barbarese and Olsen (1998), reported that on average teachers correctly answered 77.5% and 77% of the ADHD knowledge items, respectively. However, Sciutto et al. (2000) showed that, on average, teachers scored only 47.8% on the knowledge questionnaire.

Higher proportions of correct responses reported in the two earlier studies might be the result of methodological differences. First, only 20 items were used in the earlier two studies to assess knowledge, whereas, Sciutto and colleagues (2000) included 36 knowledge items. It may be that teachers' lack of ADHD knowledge is magnified when a larger number of items are tapped. Second, respondents were only provided with two response options (true or false) in Jerome et al. (1994) and Barbarese and Olsen (1998), whereas, Sciutto et al. used three options (true, false, don't know). Given that teachers had a 50% chance of guessing the correct response in the earlier studies, it is possible that the reported knowledge scores in Jerome et al. and Barbarese and Olsen, are artificially inflated.

A second difference across the studies is the impact of teaching experience on teachers' ADHD knowledge. Jerome and colleagues (1994) assessed the ADHD knowledge of

Canadian and American elementary school teachers, and found that the number of years teaching predicted higher ADHD knowledge scores for the Canadian sample but not the American sample. Furthermore, in their study of 149 American elementary-school teachers, Sciutto et al. (2000) showed that years of teaching experience was significantly related to overall knowledge of ADHD.

Exposure to children with ADHD in the classroom is an important factor in teachers' knowledge about the disorder (Sciutto et al., 2000). Specifically, teachers who reported having prior exposure to children with ADHD had significantly higher total knowledge scores than teachers without such exposure. Furthermore, it appears that the degree of this exposure is also significantly related to ADHD knowledge. That is, ADHD knowledge has been shown to be positively associated with the *number* of students with ADHD taught over a teacher's career (Sciutto et al.). In addition to actual ADHD knowledge, the assessment of teachers' perceptions of their ADHD knowledge is important, particularly in light of research showing that people tend to be optimistic about themselves.

It has been overwhelmingly shown that people are optimistic in regard to beliefs about themselves, with people believing they are *better* than the average (e.g., Eiser, Eiser, & Pauwels, 1993; Greening & Chandler, 1997; Kos & Clarke, 2001; Weinstein, 1980, 1982, 1989; Williams & Clarke, 1997; Zakay, 1996). Research into optimistic bias has assessed beliefs by comparing individuals' perceptions of a particular event, with the actual occurrence of that event. For example, Kos and Clarke found that people perceived their own risk of having a car accident as significantly lower than the risk of a peer. It is possible then that that individual would not be as careful on the road as if he would be if he was to believe he was more likely to have an accident. Given this proposition that perceived knowledge may be linked with behaviour, it is important to assess teachers' perceived ADHD knowledge as well as their actual ADHD knowledge. As far as the author is aware, the optimistic bias paradigm has not been used in the ADHD arena.

Like knowledge research, attitudinal research in regards to ADHD is somewhat limited. Published papers have tended to focus on parents of ADHD children (e.g., Johnston & Leung, 2001; Johnston & Patenaude, 1994) and doctors (e.g., Kwasman, Tinsley, & Lepper, 1995; Wagner, Eastwood, & Mitchell, 2003). While there are some studies purporting to have assessed the ADHD attitudes of primary school teachers, most assess only a small area of attitude (e.g, cause, treatment), and there are no instances of Australian data.

Studies suggesting that they are assessing teachers' attitudes appear to be doing little more than investigating ADHD knowledge. For example, Barbaresi and Olsen (1998) included the sub-heading "Teacher Attitudes and Experience" in the results section of their paper. However, upon reading this section it is obvious that the study did not really assess teachers' attitude toward ADHD. The only information provided by these researchers was basic demographic details, including additional ADHD training, ADHD specific teaching experience, and whether or not teachers had contact with prescribing physicians.

Another *misuse* of the term "attitude" appeared in Jerome et al. (1994), in which the title suggests that teachers' knowledge *and* attitudes about ADHD were assessed. However, nowhere in the paper is there a distinction between knowledge and attitudes. Furthermore, inspection of the actual survey instrument used by these researchers showed that the majority of the 20 items used in the study were merely measures of ADHD knowledge, and that attitude toward the disorder was not adequately assessed. Furthermore, as the items used in Barbaresi and Olsen (1998) were based on those used by Jerome et al., similar problems are evident in this survey instrument.

Glass and Wegar (2000) assessed the attitudes of 225 teachers regarding aetiology and treatment for ADHD. It was shown that teachers' attitudes are not always consistent - 78.2% of the sample felt that ADHD was a biological abnormality, while 11.1% believed ADHD was caused by environmental factors and 10.7% believed it was simply normal behaviour. However, regardless of teachers' perceptions about aetiology, treatment of choice was

overwhelmingly to combine medication and behaviour modification. Even though over 40 teachers reported that ADHD was caused by environmental factors alone, only 11 teachers felt that behaviour modification alone was sufficient to treat ADHD.

3.5 Teachers' Behaviour Toward Children with ADHD

Teachers' attitudes and knowledge may be expected to influence their behaviour (Glass & Weigar, 2000). For example, if a teacher believes that ADHD is caused by chemical imbalances in the brain it is unlikely that she will use psychological interventions to manage the child's behaviour. This seems quite plausible in light of research showing that the behaviour of many teachers reflects their attitudes (Alderman & Nix, 1997; DeBattista & Shepherd, 1993; Greene, 1995, 1996), and that teachers tend to resist new ideas and methods that are not representative of their belief systems (Westwood, 1996). Furthermore, if people believe they are knowledgeable about a certain topic, they may be unlikely to seek information about that topic. Teachers who feel they know a lot about ADHD may be unlikely to ask professionals (or anyone else) for information about the disorder. However, it is apparent from past studies that teachers' knowledge of ADHD is not particularly high (e.g., Jerome et al., 1994; Sciutto et al., 2000), meaning that teachers may pass incorrect information on to others (DiBattista & Shepherd).

South Australia's Department of Education, Training and Employment [DETE] conducted an investigation in 1999 involving the collaboration of health and school professionals, as well as children with ADHD and their families. As a result, DETE developed a working document to aid teachers in the classroom management of children with ADHD-like difficulties. This document indicated the value and utility of a few specific behaviour management strategies, including corrective strategies, environmental adaptation, positive programming and teaching, and emotional bolstering, to the classroom management of students with ADHD (DETE, 1999).

According to DETE (1999), corrective strategies are specific behavioural strategies used to increase or decrease target behaviours. Positive reinforcement (e.g., praise, rewards), punishment (reprimands, removal of privileges), and planned ignoring are all examples of corrective strategies. These strategies have been consistently shown to be effective in the management of ADHD-related behaviour problems (Anhalt, McNeil, & Bahl, 1998; DuPaul & Eckert, 1997; DuPaul & Power, 2000; Jarman, 1996; Pelham Jr. et al., 1998; Pfiffner, O’Leary, Rosen, & Sanderson, 1985). DuPaul and Eckert conducted a meta-analysis of 63 studies and found that behavioural interventions, particularly positive reinforcement and punishment, are quite effective in improving classroom behaviour.

Anhalt et al. (1998) highlighted the efficacy of using reinforcement for children with ADHD, showing that reinforcement is effective in decreasing overactivity and increasing on-task behaviour and academic performance in these children. Further, it was shown that both reinforcement and punishment should be implemented simultaneously for greatest efficacy. Intensive behavioural modification packages, including fixed interval schedules of reinforcement, have been developed in the US and have been shown to be extremely effective in improving the behaviour of children with ADHD (Rabiner, 1999).

DETE (1999) also discussed environmental adaptation, which includes such things as ensuring that the classroom is safe and visible, that ‘active’ and ‘quiet’ areas are established within the room, and that distracters (e.g., noise) are identified and altered. Positive programming and teaching is related to environmental adaptation, and involves strategies such as allowing extra time for tasks, breaking tasks into smaller steps, and providing set choices during free time activities. Together, environmental adaptation and positive programming and teaching, appear to be examples of antecedent stimulus control (referred to in this thesis as “Organising the classroom and curriculum”).

Research has shown the validity of these strategies in improving children’s classroom behaviour (e.g., Jarman, 1996; Montague & Warger, 1997). According to Jarman, children

with ADHD perform at their optimal level when the classroom is highly structured, routines are in place, there are minimal sensory distractions, and they are seated close to the teacher in the middle-front of the classroom. Jarman further noted that ADHD children tend to perform better when the curriculum is altered to suit their ability and they are allowed breaks during class time. This finding was supported by DuPaul and Power (2000). Finally, as an aid to children's learning and to decrease ADHD symptoms, DETE recommended teachers recognise and build upon the strengths of a child with ADHD and develop strategies to address issues occurring at home. These types of strategies were termed "Emotional support" by the current author, and may include reassurance, using humour and showing the child care and attention.

Although behaviour modification has been shown repeatedly to be efficacious in the treatment of ADHD (Chambless & Ollendick, 2001), there has been little investigation of the actual behavioural strategies teachers use in the classroom management of students with ADHD, or the reasons behind teachers' use of those strategies.

3.6 Pre-Service Teachers' Knowledge and Attitudes

There is a dearth of research in the area of pre-service (student) teachers' knowledge and attitudes toward ADHD. Considering that these teachers will shortly be employed within the education system, and will be very likely to have a student with ADHD in their class (Barkley, 1998), it is important to assess the accuracy of this population's knowledge about ADHD as well as any misperceptions they may have the disorder.

There is one brief report that the author is aware of that has compared in-service and pre-service teachers' knowledge about the disorder (Jerome, Washington, Laine, & Segal, 1998). Their findings suggested that there was little difference across the two groups of teachers in terms of knowledge about ADHD. Whilst it is possible that pre-service teachers actually have comparable ADHD knowledge to that of in-service teachers, it would seem surprising in light of research which has shown that ADHD knowledge is positively correlated

with both the length of a teacher's career and experience with teaching children with ADHD (Jerome et al., 1994; Sciutto et al., 2000). Therefore, given that unlike pre-service teachers, in-service teachers have taught before *and* have had the opportunity to teach ADHD students, one would expect in-service teachers' knowledge about ADHD to be greater than pre-service teachers' knowledge about the disorder. However, it might be that university training has improved over time, and as a result pre-service teachers have higher knowledge about ADHD than in-service teachers. That is, while in-service teachers may have ADHD specific teaching experience, many received poor initial training at the university level regarding ADHD and its management. On the contrary, pre-service teachers have not had direct experience teaching students with ADHD, but their knowledge might be compensated by their increased initial teaching training in the area. These are only possibilities, and to date there are no studies that the author is aware of that have assessed the accuracy of these hypotheses.

Pre-service teachers are likely to experience the same attitude-behaviour consistency as in-service teachers have been shown to. Therefore, it is equally important to assess pre-service teachers' attitudes toward ADHD. Further, considering that pre-service teachers will shortly be employed within the education system, and will be very likely to have an ADHD student in their class (Barkley, 1998), it is important that the accuracy of this populations' ADHD knowledge also be investigated.

3.7 Summary and Suggestions

This chapter has highlighted that children with ADHD experience a myriad of difficulties, particularly in regard to their academic performance and social skills. Further, it was shown that teachers often hold negative beliefs about externalising behaviour problems exhibited by students with ADHD, tend to be pessimistic about teaching these children, and feel they require extra time and effort to teach. It was revealed that teachers' attitudes were mediated by perceptions of competence, and that other variables such as teaching experience in general and ADHD specific teaching experience, were related to teachers' perceived

competence. Results have varied regarding teachers' knowledge about ADHD, but all suggest that there is room for improvement. Further, a number of factors, such as additional training and ADHD specific teaching experience, were shown to be significantly related to teachers' ADHD knowledge. Moreover, teachers' attitudes have not been clearly assessed in the past. Given findings regarding the link between attitudes and behaviour, there is a strong need to investigate teachers' attitudes regarding ADHD. Finally, a series of empirically validated classroom management strategies were detailed, as were studies highlighting their efficacy in the management of ADHD. Overall, although some research has been conducted in the area of teachers' knowledge, attitudes, and behaviour toward children with ADHD, there is a dearth of literature pertaining to a theoretical understanding of these variables. Understanding these variables within a theoretical context will increase our knowledge of the interplay between various factors and ADHD within the education system.

CHAPTER 4: THEORETICAL UNDERPINNINGS: THEORIES OF REASONED ACTION AND PLANNED BEHAVIOUR

4.1 Overview

This chapter describes two widely used social psychological theories designed to explain the relationship between attitudes and behaviour: the theory of reasoned action and the theory of planned behaviour. The major premise of both of these theories is that people are generally rational and make systematic use of the information they have available to them. That is, before acting, people think about the implications their behaviour may have, and thus act accordingly (Ajzen, 1985; Ajzen & Fishbein, 1980). Both theoretical models will be described and details about how the theories might be applicable in the educational arena are provided. Finally, research studies that have investigated the effectiveness of these models are discussed.

4.2 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) was developed by Martin Fishbein and Icek Ajzen during the late 1950's (Ajzen & Fishbein, 1980), and was eventually published in 1967 (Fishbein, 1967). The major purpose of the TRA was to provide a theoretical framework to enable the empirical investigation of the relationship between attitudes and behaviour, and its major aim was to predict and understand people's behaviour in specific contexts (Ajzen & Fishbein).

According to the TRA, the performance of a given behaviour is determined by three major constructs; intention, attitude, and subjective norm (see Figure 1). The first step needed to predict and understand human behaviour is to clearly define the specific target *behaviour* of interest (Ajzen & Fishbein, 1980). The TRA is effective at predicting behaviours that people chose to engage in voluntarily, such as eating sugary foods and abstaining from premarital sex (Eagly & Chaiken, 1993). Reading from right to left, Figure 1 shows that the second step in the TRA involves the notion of *intention*. Intention should be viewed as an indicator of how hard people are willing to try, *and* how much of an effort individuals are willing to exert, to

perform a particular behaviour (Ajzen, 1991b). According to the TRA, an individual's intention to perform a given behaviour is seen as the immediate determinant of the individual performing that behaviour (Ajzen & Fishbein). The TRA suggests that a person will usually act in accordance with their intentions and the stronger the intention to engage in a particular behaviour, the higher the chance of the individual actually engaging in that behaviour (Ajzen, 1991b; Ajzen & Fishbein). Finally, items used to assess intention are often phrased in terms of intent to engage in the behaviour within the next week (Ajzen & Fishbein).

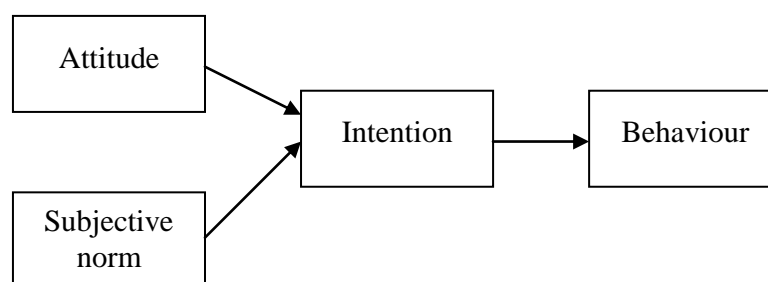


Figure 1. The theory of reasoned action

The final step in the TRA is to assess an individual's *attitude* (toward the behaviour) and their *subjective norm*. According to the TRA, these two constructs are direct determinants of a person's intention to engage in a given behaviour (see Figure 1), and are assessed in order to understand *why* people perform particular behaviours (Ajzen & Fishbein, 1980). The attitude factor refers to an individual's positive or negative evaluation of performing the behaviour (Ajzen & Fishbein; Manstead & Parker, 1995). Note that the attitude factor does not assess attitude toward the object *per se*, but rather, attitude toward the performance of a particular behaviour (Eagly & Chaiken, 1993). The subjective norm factor refers to an individual's perception of the social pressures put on them to perform or not to perform a particular behaviour (Ajzen & Fishbein; Manstead & Parker). That is, do others think I should or should not perform a particular behaviour? Finally and importantly, Ajzen and Fishbein suggested that at least three items assessing each behavioural predictor (intention, attitude, subjective norm) should be asked of respondents to adequately assess them. Overall, the TRA

argues that as a general rule, individuals will intend to perform, and subsequently perform, a given behaviour when they evaluate it positively (i.e., have a positive attitude toward it) and when they believe that people that are important to them think they should perform it (Ajzen & Fishbein; Armitage & Conner, 1999).

4.2.1 *Assessing the TRA in Educational Settings*

The TRA could be used in educational settings to help explain and understand teachers' classroom practices regarding the management of students with ADHD. For example, the *behaviour* of interest might be teachers' use of corporal punishment on students. The *intention* factor would be assessed by asking teachers a number of questions (at least three; Ajzen & Fishbein, 1980) regarding their intent to use or not use corporal punishment during the following week as a means of managing the behaviour of students with ADHD. Teachers' *attitude* toward corporal punishment would be assessed by asking them a series of questions about their beliefs regarding the effectiveness and benefit of using corporal punishment in the management of students with ADHD. Finally, teachers' perceptions of *subjective norm* might be measured by asking teachers about their beliefs regarding other teachers' perceptions concerning whether they should use corporal punishment to manage the classroom behaviour of students with ADHD.

4.2.2 *Criticisms of the TRA*

The main criticism of the TRA has been the theory's difficulty to accurately predict more complex and deliberate behaviours, such as attending health check-ups and losing weight. While the TRA assumes that people are rational and engage in behaviours after making some form of conscious decision to do so (Aronson et al., 2004), the theory has been shown to poorly predict behaviours requiring skills, opportunities and resources not easily accessible (Conner & Armitage, 1998). That is, the TRA has difficulty accurately predicting the performance of behaviours that depend on external factors and are not under the total and direct control of the individual. Ajzen (1991b) argued that an individual's behavioural

intention and subsequent behaviour differ as a direct consequence of their perception regarding the control they have over engaging in the behaviour. Ajzen developed a model, the Theory of Planned Behaviour, to test this contention.

4.3 Theory of Planned Behaviour

As suggested above, the Theory of Planned Behaviour (TPB) was developed to extend the TRA to enable the impact of perceptions of control on intention and behaviour to be investigated (Ajzen, 1985, 2001). The extension over the TRA lies in the inclusion of the *perceived behavioural control* variable (Ajzen; see Figure 2).

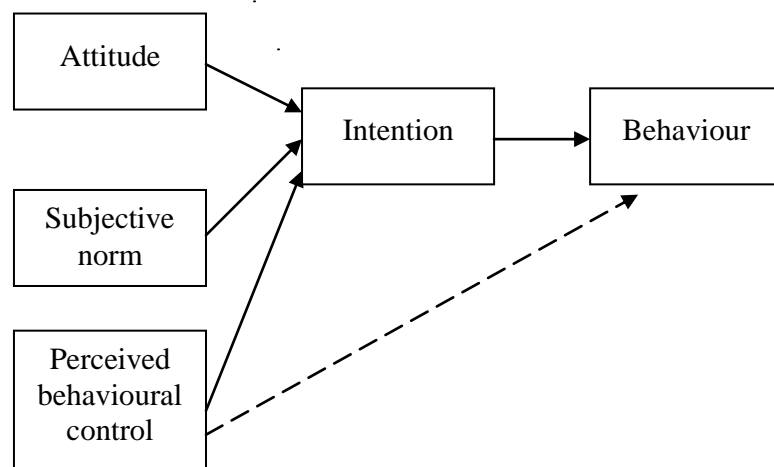


Figure 2. The theory of planned behaviour

The perceived behavioural control variable refers to a subjective assessment by an individual regarding the degree of ease or difficulty of performing the behaviour in question. That is, this predictor does not measure the *actual* control an individual has over performing a given behaviour, but rather measures one's subjective belief regarding their control over performing that behaviour (Ajzen, 1985, 1991a, 1991b, 1996, 2001). One's perception of control reflects one's personal experiences with the behaviour under investigation, as well as the obstacles believed to impede performance of the behaviour (Ajzen, 1991a). For example, a teacher who has used praise in the past to manage the behaviour problems of children and feels there are relatively few external reasons why they should not praise children, are likely

to perceive they have a lot of control over using praise as a classroom behaviour management strategy.

The addition of perceived behavioural control enabled more complex behaviours (i.e., those requiring a fair amount of skill, resources, or opportunities) to be accurately predicted (Conner & Armitage, 1998). Examples of such behaviours include losing weight, winning sports competitions, and managing children's behaviour problems.

Other than the addition of perceived behavioural control, the TRA and the TPB are identical (Ajzen, 1991b). That is, both the TRA and the TPB suggest that intention to engage in a behaviour is determined by one's (i) attitude toward the behaviour and (ii) subjective norm; and that actual behaviour is determined by one's intention to perform that behaviour. Like the TRA, the TPB aims to predict and explain human behaviour in specific contexts (Ajzen). The TPB suggests that perceived behavioural control may be linked to both intention and behaviour (see Figure 2). The theory assumes that perceived behavioural control is directly linked to intention, over and above the influence of attitude and subjective norm. Conceptually, if an individual believes they have little control over the performance of a particular behaviour, yet have a favourable attitude and subjective norm toward performing that behaviour, they are unlikely to form a strong intention to perform the behaviour (Ajzen, 1991b). This assumption is shown in Figure 2 with the arrow linking perceived behavioural control to intention.

According to the TPB, there is a possible direct link between perceived behavioural control and behaviour, independent of intention (see Figure 2). The direct link between these two variables (perceived behavioural control and behaviour) occurs when an individual's perceptions of control closely resemble the actual control the individual has over performing the behaviour. However, perceptions of control and actual control can differ markedly, and in these situations there would not be a direct relationship between perceptions of control and performance of a particular behaviour. Perceptions of control are likely to differ from reality

when "...the individual has little information about the behaviour, when requirements or available resources have changed, or when new and unfamiliar elements have entered into the situation" (Ajzen, 1991a, p. 134). The possible relationship between these perceptions of control and behaviour is represented in Figure 2 with the dotted arrow linking perceived behavioural control and behaviour. Overall, the TPB argues that perceived behavioural control can influence behaviour either indirectly, via intentions, or directly (Ajzen). Further, according to the TPB, intention to perform a particular behaviour will be strongest when one's attitude toward the behaviour and subjective norm are favourable, and when perceived behavioural control is high (Ajzen).

4.3.1 Assessing the TPB in Educational Settings

Like the TRA, the TPB could be used to explain teachers' classroom practices regarding the management of student behaviour. For example, the TPB might be used to assess teachers' use of positive reinforcement (e.g., praise, extra playtime) to manage the behaviour of students with ADHD. Teachers' *intention* would be measured by asking teachers about their intent to use or not use positive reinforcement strategies to manage students with ADHD. *Attitude* toward positive reinforcement strategies might be assessed by asking teachers their beliefs regarding the benefits and usefulness of such strategies in managing the behaviour of students with ADHD. *Subjective norm* could be measured by asking teachers about their beliefs regarding other teachers' perceptions about whether they should use positive reinforcement to manage the classroom behaviour of students with ADHD. Finally, *perceived behavioural control* might be measured by asking teachers questions about the degree of control they feel they have over using, or not using, reinforcement strategies to manage the behaviour of students with ADHD.

4.4 Empirical Investigations of the TRA and the TPB

The TRA and the TPB have been assessed extensively in the literature over the past 15 years, and both theories have strong empirical support showing their reliability to predict and

explain both behavioural intention and behaviour across various domains. The TRA and the TPB have been shown to accurately predict a large array of behaviours including; unethical behaviour (Chang, 1998), cigarette use (O'Callaghan, Callan, & Baglioni, 1999), illicit drug use (Fishbein & Middlestadt, 1987), safe sex (White, Terry, & Hogg, 1994), exercise (Brenes, Strube, & Storandt, 1998), consuming a low-fat diet (Armitage & Conner, 1999), breast self-examination (Lierman, Young Kasprzyk, & Benoliel, 1990), and homelessness (Wright, 1998).

There have also been a number of studies that have supported the utility of the TRA and the TPB within the education system. The behaviours assessed in the educational arena include; teaching methods (Crawley, 1990), enrolling in distance education courses (Becker & Gibson, 1998), participating in continued education (Pryor, 1990; Yang, Blunt, & Butler, 1994), studying science (Crawley & Coe, 1990), class attendance (Fredricks & Dossett, 1983), student studying behaviour (Sideridis, Kaissidis, & Padeliadu, 1998), teaching children with disabilities (Theodorakis, Bagiatis, & Goudas, 1995), and teachers' provision of remedial assistance to children with reading disabilities (Mandic, 1997).

However, there is no general consensus regarding which of the two theories is superior. While some studies have indicated the superiority of the TRA over the TPB (e.g., Crawley, 1990; Sideridis et al., 1998; Theodorakis et al., 1995), others have suggested that the TPB is the better model for predicting behaviour (e.g., Ajzen & Madden, 1986; Chang, 1998; Mandic, 1997; Montano & Taplin, 1991).

Crawley (1990) had 50 science teachers of grade 5/6 or 9/10 students complete a questionnaire to assess teachers' attitude, subjective norm, perceived behavioural control, and intention to use investigative teaching methods with their students. Crawley found that teachers' attitude, subjective norm, and perceived behavioural control were all significant predictors of intention, with attitude being the most significant predictor. Although significant, perceived behavioural control did not explain any additional variance over attitude

and subjective norm, thus highlighting the superiority of the TRA over the TPB. It was suggested that this was possibly due to teachers' *total* control over whether they used these teaching methods or not.

The TRA was also shown to be better than the TPB in a study of the beliefs and intentions of 99 university students taking adapted physical education courses to teach children with disabilities (Theodorakis et al., 1995). These researchers found that attitude strength was particularly important to students' intention to teach children with disabilities in the future, and that perceived behavioural control had little effect on behavioural intention. These results illustrate an important point. University students who hold positive attitudes toward teaching children with disabilities might be more likely than those with neutral or negative attitudes, to apply for teaching positions in special schools.

There is evidence however that the TPB is significantly better than its predecessor. For example, Chang (1998) had 181 university students complete a questionnaire to assess the impact attitude, subjective norm, and perceived behavioural control had on their intention to make unauthorised software copies. It was shown that perceived behavioural control offered the greatest amount of unique predictive ability of all three predictors, indicating that the TPB was superior to the TRA in terms of predicting unethical behaviour.

Ajzen and Madden (1986) also showed the superiority of the TPB in their study involving the prediction of class attendance and grades for 169 undergraduate students. This study showed that the addition of perceived behavioural control (i.e., TPB) permitted a more accurate prediction of students' intention to gain an 'A-grade' than did the TRA.

Finally, Mandic (1997) showed that the TPB did not offer a significant improvement over and above the TRA in terms of predicting teachers' intention to use remedial assistance for children with reading disabilities. However, the TPB was shown to be superior to the TRA in predicting teachers' actual use of remedial assistance with these children, with subjective norm and perceived behavioural control offering significant unique contributions to the model

(Mandic). This finding lends support to Ajzen and Fishbein (1980) claim that perceived behavioural control can directly predict behaviour independent of intention. While Mandic's findings are interesting, it must be noted that her methodology did not adhere to suggestions given by Ajzen and Fishbein regarding the inclusion of at least three items per predictor to adequately assess the models. Therefore, her findings should be considered cautiously.

4.5 Current Study

This chapter has highlighted two social psychological theories that could potentially help explain teachers' classroom management of students with ADHD, thus adding a well needed theoretical context to research in the area of ADHD and the education system. Chapter 3 highlighted the deficits in the literature pertaining to teachers' knowledge, attitudes, and behaviour toward children with ADHD. Of the studies detailed earlier (see sections 3.4, 3.5, 3.6), none represent a sample of Australian teachers. Four studies were therefore designed to extend the literature with an Australian sample of primary school teachers, and to provide a theoretical framework to understand and explain the interplay between teachers' knowledge, attitudes, and behaviour toward children with ADHD.

Based on the deficiencies of past research, the aim of the first study was to assess (1) teachers' knowledge of, and attitudes toward, ADHD, and (2) the relationships between various teacher characteristics and teachers' knowledge about the disorder. Four hypotheses were formulated based on the findings of past research. First, based on Sciutto et al. (2000), who used the three-response option format to assess knowledge (TRUE, FALSE, DON'T KNOW) it was hypothesised that on average, primary school teachers would score approximately 50% on the ADHD knowledge questionnaire. Second, higher scores on the ADHD knowledge questionnaire would be significantly associated with years of teaching experience. Third, higher scores on the ADHD questionnaire would be significantly associated with experience in teaching students with ADHD. Finally, based on the optimistic

bias literature, it was hypothesised that perceived knowledge would be significantly greater than actual knowledge.

The TRA and the TPB are two of the most influential and widely used models in psychology to help explain behaviour (Manstead & Parker, 1995). There is a wealth of data showing the utility for both of these theories in terms of their ability to predict numerous behaviours. What is not clear however, is which of the two models offer the best predictive utility to human behaviour. While it is believed that the TPB offers a significant addition to the TRA in terms of explaining behaviour and behavioural intention (Ajzen & Fishbein, 1980), there is evidence suggesting otherwise. Some research indicates that the TPB does not add significantly to the predictive ability of the TRA; whereas other literature has shown that the TPB offers significantly greater explanation than its predecessor. Considering the mixed results from the literature regarding superiority of the TRA or the TPB, this dissertation aimed to explore the ability of both theories in predicting teachers' intention to use different classroom management strategies.

Study 2 of this thesis involved an exploratory investigation into the strategies teachers use in the classroom management of children with ADHD. This study was exploratory in nature due to the inadequacy of past research. Study 3 involved an assessment of pre-service teachers' knowledge and attitudes regarding ADHD, and a comparison of these findings with the knowledge and attitudes of the in-service sample used in study 1. Extrapolating from the findings of Sciutto et al. (2000) that teaching experience is significantly related to knowledge scores, it was hypothesised that in-service teachers would correctly answer significantly more of the ADHD knowledge statements (actual knowledge) than pre-service teachers. As with study 1, it was also hypothesised that perceived knowledge would be significantly greater than actual knowledge for all respondents.

Finally, given the findings of past research regarding teachers' knowledge about ADHD, it was anticipated that an educational package such as a workshop or seminar would

need to be developed and run for teachers. Hence, study 4 was planned from the outset, even though it was not fully developed until the data from studies 1, 2, and 3 were collected and analysed.

CHAPTER 5: MEASURES: DEVELOPMENT AND CODING

5.1 Overview

This section provides information about the development and coding of the three measures used in this thesis; self-report ADHD questionnaire, classroom management strategies recording sheet, and the classroom management strategies diary. Each of these measures is described, and details about the pilot study conducted to assess the appropriateness and length of the first two measures are then provided. The chapter ends with an explanation of the coding procedures used for data entry.

5.2 Self-Report ADHD Questionnaire

As stated earlier (see section 4.4), there is little published research in the area of teachers' knowledge, attitudes, and behaviour towards children with ADHD. As a result, there was a need to develop appropriate instruments to adequately measure each of these variables. The self-report questionnaire was developed specifically for the purpose of this dissertation (Refer to Appendix A) and contained six separate sections (Sections A through F).

5.2.1 Section A

Section A collected demographic information about each respondent, including their gender, age, qualifications obtained, number of years they had been teaching, and the grade currently being taught. Teachers were asked to circle if they were either "M" (Male) or "F" (Female). Space was provided to allow teachers to write their age, the qualifications they had obtained, the number of years they had been teaching, and the grade they currently taught.

Information was also collected on whether or not participant's university education involved information about ADHD, as well as skill development to manage children with ADHD. Participants were also asked to record whether or not they had engaged in additional training regarding ADHD during their teaching career. Teachers were also asked to record if they had ever taught a student with ADHD. A Yes/No response format was used to assess each of these variables.

Teachers who had taught an ADHD student were then asked to record (i) how many ADHD students they had taught in the past, (ii) when they last taught an ADHD student, (iii) how many of the ADHD students were prescribed medication for ADHD, and (iv) if they generally had contact with the prescribing physicians. Teachers were then asked to note how many children they had taught whom they thought should have a diagnosis of ADHD but did not. They also indicated categorically whether their school employed people specifically to help children with ADHD.

Questions assessing demographics were the same across the in-service and pre-service teacher samples with two exceptions: in-service teachers were asked to record the number of years they had been teaching, as well as the number of students with ADHD they had taught during their career, but pre-service teachers were not asked these questions. Appendix B shows the first page of the self-report ADHD questionnaire used for pre-service teachers. The remainder of the questionnaire was identical for both groups of teachers.

The final question in Section A assessed respondents' perceptions of how much they thought they knew about ADHD (i.e., perceived knowledge). Perceived knowledge was measured on a 10cm visual analogue scale, whereby teachers were asked to place a cross on the part of the line that best represented how much they thought they knew about ADHD. The scale was anchored at both ends with “Very Little” (0 cm) and “A Lot” (10 cm). The visual analogue scale was used in the current questionnaire because of methodological difficulties associated with likert scales; only a limited number of response categories are available and mathematical assumptions are made about these categories.

Likert scales typically limit respondents to select from five or seven choices (e.g., Lek & Bishop, 1995; McGee & Cairns, 1994), and without documented reason, other than ease of analysis, these responses are then assumed to be mathematically equidistant and symmetrical, and are thus assigned numerical values accordingly. Research has shown that mirror image phrases such as “likely” and “unlikely” are neither symmetrical nor equidistant (Clarke,

Ruffin, Hill, & Beaman, 1992; Reagan, Mosteller, & Youtz, 1989), meaning that this assumption may limit our understanding of the particular phenomenon under investigation. For example, if we say that “We are very likely to use reinforcement to manage the behaviour of a student with ADHD”; does this mean that we are 95% likely, or only 50% likely to perform this particular behaviour? Likert scales do not provide an answer to this question. But continuous scales, such as the visual analogue scale, do (Clarke et al., 1992).

Visual analogue scales have been used frequently in the literature (e.g., Hoorens & Buunk, 1993; Kos & Clarke, 2001; Williams & Clarke, 1997). These scales are generally 10cm in length, and anchored at “Strongly agree” (0cm) and “Strongly disagree” (10cm). Unlike likert scales, visual analogue scales enable respondents to indicate their precise attitude toward a particular statement (McCoy et al., 1992), and people find them easier to use than likert scales (Weinstein, 1980). Overall, considering the limitations of likert scales and the advantages of visual analogue scales, the latter were used in the present study to assess primary schools teachers’ perceived knowledge, attitudes and behaviour towards children with ADHD.

5.2.2 *Section B*

This section contained 27 items designed to assess knowledge about ADHD (Actual knowledge). The individual scale items were derived from the scales used by Sciutto et al. (2000) and Jerome et al. (1994), with all included items having considerable documented empirical support. At the time the current questionnaire was being developed, Sciutto was developing some further items to assess teachers’ ADHD knowledge. Three of these items (16, 37, 38 - see Appendix A) were included in the current questionnaire as a further means of assessing the usefulness and viability of these newly developed scale items (M.J. Sciutto, Personal communication, May 5 2000).

For each of the 27 items, respondents were asked to circle one of three response options, (TRUE, FALSE, or DON'T KNOW), to indicate what they believed to be the correct

answer. Data were entered into the spreadsheet to indicate if the teacher answered the item correctly (“1”), incorrectly (“2”), or did not know the answer (“3”).

5.2.3 Section C

In this section participants were provided with one of eight hypothetical vignettes developed by the researcher (see Appendix C for a copy of each of the vignettes). The vignettes were designed to depict a child with one of the three DSM-IV (APA, 1994) subtypes of ADHD, or a typically developing child with some behavioural problems. There were two vignettes developed for each subtype, one depicting a boy, the second a girl. The two vignettes depicting the exact same condition were identical other than changes to gender related words, such as he/she, and boy/girl.

Teachers received only one vignette. They were asked to read the vignette and then to indicate if they thought the child depicted in the vignette had a diagnosis of ADHD, but were not required to identify the subtype. This task aimed to assess teachers' ability to accurately identify children with or without ADHD based on the criteria necessary for a diagnosis of the condition. Teachers' responses were coded as correct (“1”), incorrect (“2”), or don't know (“3”), to indicate diagnostic accuracy.

Respondents were then provided with a list of 33 strategies, and were asked to place a tick beside the strategies they would use in their classroom to manage the child depicted in the vignette they had just read. Responses to these items were coded as either yes (“1”) or no (“2”). Teachers were also given the opportunity to specify additional strategies they would use. The final part of section C asked teachers to record what may prevent them from implementing the strategies they had just selected. Teachers' responses to this item were not coded but were assessed qualitatively.

Vignette development: Validity and reliability. A convenience sample of eight psychologists known to the author was used to ensure that these vignettes actually depicted children with ADHD Predominantly Hyperactive-Impulsive Type, ADHD Predominantly

Inattentive Type, ADHD Combined Type, or no diagnosis. Each of the psychologists was eligible for membership of either the Clinical ($n = 3$) or the Educational/Developmental college ($n = 4$) of the Australian Psychological Society (APS). One psychologist was eligible for membership in both APS colleges. Although only two of the psychologists worked extensively with young people with Disruptive Behaviour Disorders, each of the psychologists had clinical experience with ADHD clients.

To assess content and face validity of the vignettes, the author developed and hand delivered a document to each psychologist (see Appendix D) containing four vignettes – one for each ADHD subtype and a typically developing child. Gender was not an issue when selecting vignettes for inclusion. The vignettes were counter-balanced to eliminate any order effects. Each psychologist was provided with four vignettes and was asked to read the first vignette and then to place a tick in the box that they believed best described the diagnosis in that particular vignette. Respondents were then asked to complete the remaining three vignettes in the same manner.

Inter-rater reliability was 100% for each of the vignettes depicting a child with a diagnosis of ADHD, regardless of subtype. The control-group vignettes yielded an inter-rater reliability score of 75%. Two of the eight respondents thought the child depicted in the control vignette had ADHD (one would have diagnosed the child with Predominantly Hyperactive-Impulsive Type, the other would have diagnosed the child with Combined Type). As a result of this discrepancy the control group vignettes were changed to ensure that a DSM-IV diagnosis of ADHD would not be possible. For example, a sentence was included to show that the behavioural problems occurring at school were not apparent at home. That is, for a DSM-IV (APA, 1994) diagnosis of ADHD, Criterion C would not be met because the child's behaviours were not occurring across settings (APA, 1994).

Finally, six of the psychologists made suggestions regarding minor changes to make to the vignettes to increase the content validity of an ADHD diagnosis. These changes included

the inclusion of information supporting Criterion B, C, and D for a DSM-IV (APA, 1994) diagnosis of ADHD. For example, a sentence was added to each of the six vignettes depicting a child with ADHD to show that the child had (i) some hyperactive-impulsive or inattentive symptoms that caused impairment before the age of seven years, (ii) some impairment from the symptoms was present in two or more settings (e.g., at school and at home), and (iii) shown clear evidence of clinically significant impairment in social and academic functioning.

5.2.4 Section D

Teachers' general beliefs about ADHD, as well as their attitudes about teaching students with the disorder were assessed in this section. Visual analogue scales were used to assess this. Teachers were asked to place a cross on the part of the line that best represented what they believed for each of 31 statements. Responses on the 10cm visual analogue scale were anchored at “Strongly Agree” (0cm) and “Strongly Disagree” (10cm). To decrease the effect of response sets, some of these items were phrased positively and others negatively. Eight items were reverse scored to ensure that a higher mean score corresponded to a more positive attitude toward ADHD. These eight items are shown in Appendix E. Note that some items (e.g., *ADHD is diagnosed too often*; *Children with ADHD should be taught in the regular school system*) were not clearly positive or negative.

5.2.5 Section E

This section was designed to assess the ability of the TRA and the TBP to predict the behavioural strategies teachers use in the classroom management of students with ADHD. Items were developed according to the guidelines suggested by Ajzen and Fishbein (1980). Teachers were asked to place a cross on the part of the line that best represented what they believed for each of 55 statements. Responses on the 10cm visual analogue scale were anchored at both ends with “Strongly Agree” (0 cm) and “Strongly Disagree” (10 cm). Items 98 through 112 were only relevant to teachers who currently had a child with ADHD in their classroom.

To assess the effectiveness of the TRA and the TPB, five variables were created based on teachers' responses. These variables were intention, attitude toward the strategy, teacher and parent subjective norms, and perceived behavioural control. Each of these variables was created by averaging teachers' responses to three separate items. For example, intention to use reinforcement was measured by averaging teachers' responses to items 98, 103, and 108. This same procedure was used to calculate average intention scores for the remaining four behaviour management strategies (negative consequences, planned ignoring, organising the classroom and curriculum, emotional support).

The same procedure was then used to calculate average scores for the remaining theoretical factors (attitude, teacher norm, parent norm, and perceived behavioural control), for each of the behaviour management strategies. The items that were averaged to form each of these variables (intention, attitude, teacher norm, parent norm, and perceived behavioural control) across each strategy are shown in Appendix F.

5.2.6 Section F

The aim of this section was to identify teachers' desires regarding additional training in the area of ADHD. Teachers were asked whether or not they believed they could benefit from such training. If they answered affirmatively, teachers were then asked to tick boxes to represent what aspects of ADHD they would like to receive information about. The final question in the survey asked teachers to identify the best way they felt they could learn more about ADHD. More specifically, teachers were given five options and were asked to rate them in order of preference. Teachers were also provided with an *other* option in case they wanted to receive additional information via a different means than the options provided.

5.2.7 Reliability and Validity Measures

To assess the reliability of the 27-item knowledge scale, all of the items were entered simultaneously into a reliability analysis. The resultant Chronbach's Alpha was .78, suggesting a highly reliable scale. Split-half reliability was then calculated as a further

measure of the scale's reliability. The scale was split via automated item selection from SPSS. The correlation between the two forms was generally moderate to high (Spearman-Brown Coefficient Unequal Length = .79; Chronbach's Alpha = .66), indicating good reliability between scale items.

Scale items were selected after a thorough examination of the available literature to ensure that different ADHD knowledge areas (e.g., treatment, aetiology) were assessed. In particular, items were derived from scales used by Sciutto et al (2000) and Jerome et al. (1994). Further, the questionnaire was piloted on a convenience sample of eight Victorian primary school teachers to assess both content and face validity. Participants were asked to read the questionnaire and make comments regarding its appearance, appropriateness for teachers, and ease of understanding regarding what teachers would be requested to do. The procedures used to develop the scale and the findings of the pilot study thus supported the presence of both content and face validity.

Finally, a factor analysis was conducted on the items forming the attitude scale (see section 6.3.6). This analysis revealed seven distinct factors, thus indicating the presence of construct validity.

5.3 Classroom Management Strategies Recording Sheet (Phase 1)

An additional sheet aimed at assessing the frequency with which teachers reportedly use the five classroom management strategies was developed. The strategies assessed were reinforcement, negative consequences, planned ignoring, organising the classroom and curriculum, and emotional support. The recording sheet was developed after consultation with an educational psychologist. Teachers who were currently teaching a child with ADHD were asked to place a tick in the respective square to indicate the number of times they performed a particular strategy each school day. For example, if a teacher used reinforcement twice on Monday, she would have placed two ticks in the reinforcement square in the Monday column (see Appendix G for a copy of the recording sheet).

Teachers were informed in the initial questionnaire package that the recording sheet was only to be completed by teachers who currently had a child with ADHD in their class. Data were also collected on the ADHD child's gender, age, grade, and ADHD medication status, as well as a brief qualitative description of the child's classroom behaviour

5.4 Pilot Study

The questionnaire and the classroom management strategies recording sheet were piloted on a convenience sample of eight Victorian primary school teachers to assess both content and face validity, as well as a means of obtaining an indication of the time required to complete the questionnaire. Content and face validity were also assessed for the additional recording sheet—participants were asked to read the recording sheet and make comments regarding its appearance, appropriateness for teachers, and ease of understanding regarding what teachers would be requested to do. Participants were not asked to complete the additional recording sheet.

5.4.1 Participants

The pilot study sample included eight female State primary school teachers personally known to either the researcher or the research supervisors. Their ages ranged from 23 to 54 years, with a mean age of 36.8 years ($SD = 11.0$ years). The sample's general teaching experience ranged from 1 to 25 years, with an average of 12.8 years ($SD = 8.8$ years).

5.4.2 Materials

The questionnaire and classroom management strategies recording sheet discussed above (see sections 5.2 and 5.3, respectively) were used in the pilot study.

5.4.3 Procedure

Potential respondents were contacted via the telephone and were asked if they would be willing to read and make comments on the questionnaire and the additional recording sheet. All those contacted agreed to participate in the pilot study. Questionnaires were then

sent to each of these eight teachers. Participants were provided with a reply paid and addressed envelope, and were asked to return completed questionnaires to the researcher.

5.4.4 Findings

The findings suggested that the questionnaire and classroom management strategies recording sheet had face validity—respondents thought the questionnaire was quite easy to understand and believed that the questionnaire would be acceptable for primary school teachers to complete. Further, it was shown that the time the questionnaire took to complete ranged from 20 to 40 minutes, with a mean of 23.8 minutes. Therefore, no changes were made to the questionnaire or the recording sheet.

5.5 Coding Procedures

5.5.1 Self-Report ADHD Questionnaire

To help ensure anonymity, each of the completed questionnaires were coded from 1 to 120, and each of the 16 participating schools were coded from 1 to 16. Individual responses for all items from sections A through F were coded and then entered into a Statistical Package for Social Sciences (SPSS 10) spreadsheet. These codes are detailed below.

All items with categorical response formats (e.g., female/male, yes/no, correct, incorrect, don't know) were coded as: 1 (female, yes, correct); 2 (male, no, incorrect); or 3 (don't know). Qualification obtained was also coded categorically (1 = Bachelors Degree, 2 = Diploma, 3 = both a Bachelors Degree and a Diploma, 4 = Teaching Certificates, 5 = Graduate Diploma, 6 = Masters Degree, and 7 = no answer recorded). The grade currently been taught by each respondent was initially recorded verbatim into the spreadsheet, and was then recoded as either 1 (junior; prep to grade 2), 2 (middle; grades 3&4), 3 (senior; grades 5&6), 4 (principal), 5 (specialist teacher), 6 (multi-grades, such as prep to grade 6), or 7 (other), to aid in subsequent statistical analyses. Responses to items 2, 4 and 9, were recorded verbatim. The last time teachers had taught a child with ADHD was coded as the number of years since last teaching such a child. For example, a score of 1 was recorded for teachers

who had taught a student with ADHD last year, and a score of 0 was recorded for teachers who currently had a child with ADHD in their class.

Perceptions of knowledge were recorded in increments of half-centimetres. It was not possible to use a more precise measurement, such as millimetres, due to inaccurate recording by some respondents. That is, teachers tended to mark their responses away from the visual analogue scale (i.e., the cross was rarely on the line) for all items across the questionnaire (i.e., items 11 and 42 through 129). Scores were recorded up or down to the closest half-centimetre point. For example, a response of 5.3cm was recorded as 5.5cm.

To reflect teacher's responses regarding their intention to use or not use each of the 34 individual strategies included in item 40, each of the strategies were initially coded categorically. Scores were then summed to show the total number of each of the five *major* strategies; reinforcement, negative consequences, planned ignoring, organising the classroom and curriculum, and emotional support, selected by each teacher. The highest possible score for reinforcement was 3, 8 for negative consequences, 1 for planned ignoring, 13 for classroom and curriculum, and 4 for emotional support. The remaining five individual strategies included an item to assess both intention to use a token economy and modelling, as well as two "take no action" options and an "other" item. Appendix H sets out which strategies were included in each of the major strategy groups, as well as the five individual strategies, that could be selected.

Teachers' attitude, teacher norm, parent norm, perceived behavioural control, and intention toward each of the five behaviour management strategies (reinforcement, negative consequences, planned ignoring, organising the classroom and curriculum, and emotional support) were calculated by averaging responses to items related to each strategy. Items 83 through 92 were reverse scored to ensure that a higher score indicated that the respondent felt they had a lot of control over the use of each of the five classroom management strategies. Responses to items 93 to 97 were not reversed scored. Teachers' perceptions of control were

then calculated by averaging responses to the three control-related items for each of the five behaviour management strategies. For example, items 83, 88, and 93 were averaged to form the variable, *perceived control over using reinforcement*. Appendix F shows which items were used to create each of these variables, as well as which items were reverse scored prior to the variable's development.

5.5.2 Classroom Management Strategies Recording Sheet

Demographic data collected for the recording sheet was coded in the same manner as the questionnaire data. That is categorical items were coded as: 1 (female, yes, correct); 2 (male, no, incorrect); or 3 (don't know), and qualifications were coded as (1 = Bachelors Degree, 2 = Diploma, 3 = both a Bachelors Degree and a Diploma, 4 = Teaching Certificates, 5 = Graduate Diploma, 6 = Masters Degree). The child's age and type of medication taken was recorded verbatim, and the child's grade was recorded as either 1 (junior; prep to grade 2), 2 (middle; grades 3&4) or 3 (senior; grades 5&6).

For each of the respondents, the total number of reported usages for each of the five strategies, across the one-week period, was entered into the SPSS spreadsheet. To reflect the extent of each teacher's usage of the five strategies, weekly rates for each strategy were calculated for each participant. These weekly rates were calculated by dividing the number of usages for a particular strategy by the total number of strategies the teachers used during that week. For example, if a teacher reported that they used reinforcement five times during the week, and in total used 25 examples of the strategies, that teacher would receive a weekly reinforcement score of 20%. A weekly rate was calculated for each of the five strategies for each teacher.

5.6 Classroom Management Strategies Diary (Phase 2) and Coding Procedures

A classroom management strategies diary was designed to assess teacher's behaviour, as well as any possible antecedents for, and consequences of, implementing the particular behaviour management strategy. The diary also enabled an assessment of the accuracy of

teachers' identification of the strategies they reported using during the week. Teachers were asked to record (a) what they did (i.e., what was involved in the behaviour management strategy they used?) (b) what the child did to warrant the use of this particular behaviour management strategy, and (c) what the outcome was of using this particular behaviour management strategy, for a one-week period. Each time a strategy was detailed, teachers were also asked to record which one of the five strategies they had just used (Refer to Appendix I to a copy of the diary).

All demographic variables were coded in the same manner as in Phase 1. To ascertain whether teachers were able to accurately identify the strategies they used the researcher read each of the 96 examples of behaviour management strategies and coded each example as one of the strategy types. Two lay people known personally to the researcher also coded the examples given by teachers. Inter-rater reliability across the researcher and the additional two raters was 100%.

CHAPTER 6: STUDY 1

PRIMARY SCHOOL TEACHERS' KNOWLEDGE, ATTITUDES AND BEHAVIOURAL INTENTIONS REGARDING CHILDREN WITH ADHD

6.1 Overview

This chapter presents the method and results for Study 1, which involved the assessment of primary school teachers' knowledge about, and attitudes toward, children with ADHD. Study 1 also assessed teachers' beliefs about a number of additional variables, including, (a) school policies and resources, (b) perceptions of subjective norm and control, (c) teachers' ability to identify children with and without ADHD, (d) teachers' perceptions about the effectiveness and benefits of using behaviour modification techniques in the classroom behaviour management of students with ADHD, and (e) teachers' desire to engage in ADHD training programs. Further, the strategies teachers intend to use in the classroom management of problematic students were also investigated. Finally, Study 1 involved an assessment of the Theories of Reasoned Action and Planned Behaviour (Ajzen, 1985; Ajzen & Fishbein, 1980) in terms of their utility for predicting teachers' behavioural intentions.

6.2 Method

6.2.1 Participants

The sample consisted of 120 (91 female, 29 male) Victorian primary school teachers from 10 Catholic and 6 private schools. Seventy-six participants (57 female, 19 male) were from Catholic schools, and 44 participants (34 female, 10 male) taught in private schools. The age of teachers ranged from 22 to 59 years, with a mean age of 39.2 years ($SD = 10.2$ years).

Primary school teachers were selected as participants in this study for three main reasons. First, primary school often signifies the first time that children are asked to behave in ways that are often problematic for children with ADHD. For example, school children are frequently asked to sit on their chair, listen to stories, and listen to and follow through on teacher's instructions. The performance of these behaviours is often difficult for children with ADHD, thus primary school teachers often see children with ADHD experiencing these

difficulties. Second, teachers spend a considerable amount of time with children, and as such, are often regarded as one of the best sources of behavioural information for assessment of ADHD. Third, research has shown that although teachers' knowledge of ADHD needs improvement (Barbarese & Olsen, 1998; Jerome et al., 1994; Sciutto et al., 2000), teachers remain a common source of information for parents of children with ADHD (Bussing et al., 1998).

6.2.2 Materials

The self-report questionnaire detailed in Section 5.2 was used in this study to measure teachers' knowledge about, and attitudes toward ADHD, including beliefs about the disorder itself, the usefulness of behaviour modification in the classroom, subjective norm, and perceived control. The questionnaire also assessed the ability of teachers to accurately identify children with or without ADHD, as well as the strategies teachers might use in the classroom to manage problematic student behaviour. Refer to Appendix A for a copy of this measure.

6.2.3 Procedure

Ethical clearances from RMIT University (Faculty of Applied Science Human Research Ethics Committee) and from the Catholic Education Office (Victoria) were sought and granted (see Appendix J). The researcher then sent a letter to the principals of 13 Catholic and 6 private primary schools in the City of Greater Geelong and Surf Coast Shire (Victoria, Australia) to introduce herself, provide a brief description of the study, and to inform the principal that she would telephone later in the week to determine if the school wished to participate. A copy of this letter is provided in Appendix K.

The telephone call that followed ensured that principals had received the initial introductory letter, and enabled the researcher to make an appointment time to visit the school and deliver the questionnaire packages.

When the researcher telephoned each school the following week, three principals (each from Catholic schools) stated that they did not want their school to be involved in the

study. One principal indicated that his staff were already over-worked and would not have time to complete the measures. The remaining two principals indicated that teachers had recently completed surveys for another university study, and felt that the teachers would not want to participate in a further survey-based study.

The researcher then visited the remaining 16 schools to deliver the questionnaire packages, which were provided in an A4 envelope and contained the plain language statement (see Appendix L) and the self-report questionnaire. Potential respondents were asked to complete the questionnaire within the next two weeks and to return it in the sealed envelope to the marked box in the staffroom at their school. This box was prepared and delivered to schools by the researcher. The researcher returned to each school after two weeks to collect the completed questionnaires.

Approximately two weeks after the collection of the questionnaire packages, the researcher telephoned the principal of two schools that had not completed and returned all of the questionnaires initially delivered to them. This was to ensure that all completed questionnaires were included in the study. Five additional completed questionnaires were collected at this time. Of the 161 questionnaires delivered to teachers, 120 were returned, giving a response rate of 74.5%. Following the collection and analysis of the data derived from this study, all schools who participated were sent a summary of the main findings (see Appendix M).

6.3 Results

6.3.1 Demographic Information

Of the 120 teachers who participated, 61 held a Bachelor of Education Degree (BE), 17 held a Diploma of Teaching (DT), and 14 held both a BE and a DT. A further five participants held only a Teaching Certificate. Eighteen teachers had undertaken a Graduate Diploma, and three participants held a Masters Degree in addition to their BE qualification. Two respondents failed to complete this item in the questionnaire.

The duration of respondents' teaching experience ranged from 1 to 40 years, with a mean of 15.2 years ($SD = 8.8$ years). At the time of data collection, 53 teachers were teaching junior grade levels (prep, 1, or 2), 34 were teaching middle school grades (3 or 4), and 20 teachers were teaching in the senior levels (grades 5 or 6). There were also five school principals who participated in the study, three special education teachers, two teacher-librarians, and one language other than English (LOTE) teacher. Two respondents taught multi-age grades; one taught grade prep through four, while the other taught grade prep through six.

Eight of the 120 (6.7%) respondents indicated that their university education involved information about ADHD, and three (2.5%) respondents said that they had engaged in skill development to manage children with ADHD as part of their university education.

Eighty-three percent (99/120) of teachers had taught an ADHD student some time in their career. The number of ADHD students taught across the 120 teachers ranged from 0 to 20, with the average being 5 ($SD = 3.4$) students over a teacher's career. While only 42 teachers were currently teaching a student with ADHD, an additional 33 respondents had taught such a student in the previous 12 months. A further 15 teachers reported that they had taught an ADHD student about two years ago. The remaining nine teachers indicated that they had taught an ADHD student between three and six years ago.

Data from the 99 teachers who reported teaching at least one student with ADHD showed that, per teacher, the number of students with ADHD on medication ranged from 0 to 10, with an average of 3.8 ($SD = 2.4$) students on medication. These data also showed that 24 teachers indicated that they generally had contact with the physician(s) who prescribed medication for the student(s), whilst the remaining 75 respondents reported having no such contact with prescribing physicians.

Fifty-seven respondents stated that they had taught at least one student whom they thought had ADHD but had not been formerly diagnosed with the condition. Of students

taught, the number of children teachers believed should be diagnosed with ADHD (but were not) ranged from 0 to 20, with an average of 2.1 ($SD = 3.6$) children per teacher.

Eleven of the 120 teachers indicated that their school employed people specifically to help children with ADHD. However, there was little consistency between teachers within the one school. That is, not all teachers from the four Catholic and two private schools represented by these 11 teachers agreed that their school employed people specifically to help ADHD students. For example, in four of the six schools (3 Catholic, 1 private) reported to have ADHD specific staff, only one teacher from each school indicated this to be the case. In the remaining two schools (1 Catholic, 1 private), three out of the seven, and four out of the nine teachers, respectively, stated that people are employed at their school specially to help children with ADHD. Teachers from the remaining schools all indicated that their school did not have people specifically employed to help children with ADHD.

Finally, although 119 of the 120 participants (99%) reported that they would like to be involved in additional training regarding ADHD, only 35 of the 120 teachers (30%) reported having engaged in such training. The aspect teachers most wanted information on was classroom management ($n=112$), followed by treatment ($n=97$), assessment and diagnosis ($n=90$), cause ($n=87$) and long-term outcome ($n=87$). Sixty teachers indicated wanting to know more about the prevalence of ADHD, whilst 55 teachers wanted information about the history of the disorder.

The most preferred means of learning more about ADHD was via a workshop ($n=69$), followed by a seminar ($n = 55$), and written materials ($n = 27$). The use of CD materials and the use of a web page accessible via the internet were selected as the first choice by 19 teachers.

6.3.2 Knowledge Regarding ADHD

Teachers' perceived knowledge scores ranged from 1 to 9.5 cm, with an average score of 4.77 cm ($SD = 2.2$) or 47.7% across the sample of teachers. Teachers' actual knowledge of

ADHD scores ranged from 5 to 25 (18.5% to 92.6%) out of a possible 27. The average actual knowledge score was 16.4 ($SD = 4.0$) out of the 27-items, which corresponded to 60.7% correct. Incorrect responses ranged from 0 to 12 items (0% to 44.4% incorrect), with an average incorrect response rate of 3.9 items ($SD = 2.4$). Don't know responses ranged from 0 to 19 items (0% to 70%), with an average don't know response rate of 6.7 items ($SD = 4.3$) across the sample.

Table 1 shows the percentage (and total number) of teachers who got each of the 27 knowledge items correct, incorrect, or did not know the answer (don't know). Inspection of Table 1 shows that items 24 and 17 were the most commonly correctly answered items. Items 11, 14, and 25 were also commonly answered correctly. Table 1 also shows that items 12 and 23 were the most commonly incorrectly answered items. As shown in Table 1, a large proportion of teachers incorrectly answered items 2, 13, and 27 as well. Further inspection of Table 1 shows that the vast majority of respondents selected the *don't know* option for item 26 and that a number of participants also chose the *don't know* option for items 10, 13, and 27.

Table 1
Percentage of the 120 Teachers (Total Number in Parenthesis) Who Got Each of the 27 Knowledge Items Correct, Incorrect, or Did Not Know the Answer

Item number	Item	% Correct	% Incorrect	% Don't know
1	There are a greater number of boys than girls with ADHD	81.7 ($n = 98$)	5.8 ($n = 7$)	12.5 ($n = 15$)
2	There is approximately 1 child in every classroom with a diagnosis of ADHD	45 ($n = 54$)	26.7 ($n = 32$)	28.3 ($n = 34$)
3	If medication is prescribed, educational interventions are often unnecessary	75 ($n = 90$)	9.2 ($n = 11$)	15.8 ($n = 19$)
4	ADHD children are born with biological vulnerabilities towards inattention and poor self control	48.3 ($n = 58$)	16.70 ($n = 20$)	35 ($n = 42$)
5	If a child responds to stimulant medication (e.g., Ritalin) then they probably have ADHD	47.5 ($n = 57$)	20 ($n = 24$)	32.5 ($n = 39$)
6	A child who is not over-active, but fails to pay attention, may have ADHD	60 ($n = 72$)	20 ($n = 24$)	20 ($n = 24$)
7	ADHD is often caused by food additives	57.5 ($n = 69$)	20 ($n = 24$)	22.5 ($n = 27$)
8	ADHD can be diagnosed in the doctor's office most of the time	69.2 ($n = 83$)	12.5 ($n = 15$)	18.3 ($n = 22$)

Table 1 cont

9	Children with ADHD always need a quiet environment to concentrate	50.8 (n = 61)	20.8 (n = 25)	28.8 (n = 34)
10	Approximately 5% of Australian school-aged children have ADHD	35.8 (n = 43)	9.2 (n = 11)	55 (n = 66)
11	ADHD children are usually from single parent families	87.5 (n = 105)	3.3 (n = 4)	9.2 (n = 11)
12	Diets are usually not helpful in treating most children with ADHD	14.2 (n = 17)	45.8 (n = 55)	40 (n = 48)
13	ADHD can be inherited	42.5 (n = 51)	24.2 (n = 29)	33.3 (n = 40)
14	Medication is a cure for ADHD	84.2 (n = 101)	5 (n = 6)	10.8 (n = 13)
15	All children with ADHD are over-active	77.5 (n = 93)	11.7 (n = 14)	10.8 (n = 13)
16	There are subtypes of ADHD	75 (n = 90)	1.7 (n = 2)	23.3 (n = 28)
17	ADHD affects male children only	95.8 (n = 115)	0.8 (n = 1)	3.3 (n = 4)
18	The cause of ADHD is unknown	32.5 (n = 39)	14.2 (n = 17)	53.3 (n = 64)
19	ADHD is the result of poor parenting practices	80 (n = 96)	6.7 (n = 8)	13.3 (n = 16)
20	If a child can play Nintendo for hours, than s/he probably doesn't have ADHD	77.5 (n = 93)	2.5 (n = 3)	20 (n = 24)
21	Children with ADHD cannot sit still long enough to pay attention	65.8 (n = 79)	21.7 (n = 26)	12.5 (n = 15)
22	ADHD is caused by too much sugar in the diet	75 (n = 90)	5 (n = 6)	20 (n = 24)
23	Family dysfunction may increase the likelihood that a child will be diagnosed with ADHD	35 (n = 42)	42.5 (n = 51)	22.5 (n = 27)
24	Children from any walk of life can have ADHD	96.7 (n = 116)	0.8 (n = 1)	2.5 (n = 3)
25	Children with ADHD usually have good peer relations because of their outgoing nature	88.3 (n = 106)	4.2 (n = 5)	7.5 (n = 9)
26	Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood	21.7 (n = 26)	4.2 (n = 5)	74.2 (n = 89)
27	Children with ADHD generally display an inflexible adherence to specific routines and rituals	22.5 (n = 27)	35.8 (n = 43)	41.7 (n = 50)

6.3.3 Correlation Analyses

Two-tailed Pearson, Point-biserial, or Phi-correlations ($\alpha = .05$) were carried out to investigate the relationships between perceived and actual knowledge, and teacher characteristics, including age, gender, additional ADHD training, years of teaching experience, having ever taught a student with ADHD, and number of ADHD students taught.

Table 3 shows the relationships between these variables. Gender was not significantly correlated with any of the variables.

Inspection of Table 2 shows that older teachers were more likely than younger teachers to have had greater teaching experience in general, as well as being more likely to have ever taught an ADHD student during their career. Similarly, teachers with greater years of teaching experience were more likely than less experienced teachers to have ever taught a student with ADHD. However, the actual number of ADHD students taught was not significantly related to either age or years of teaching experience.

Table 2 also shows that in-service teachers' perception of their own knowledge was moderately correlated with their actual knowledge scores. Furthermore, having ever taught a student with ADHD was significantly related to both perceived knowledge and actual knowledge scores. Moreover, teachers with more years of teaching experience generally perceived themselves as having significantly more knowledge than did less experienced teachers. However, teaching experience was not significantly correlated with actual knowledge scores. Age was not related to perceived or actual knowledge.

Table 2
Correlation Coefficients for Various In-Service Teacher Characteristics

	1	2	3	4	5	6	7	8
1 Perceived knowledge								
2 Actual knowledge	.46**							
3 Age	.12	.04						
4 Sex	.03	.03	.11					
5 Additional training	.28**	.24*	.24	.12				
6 Years of teaching experience	.21	.06	.87**	.07	.22*			
7 Ever taught an ADHD student	.28**	.42**	.22*	.06	.20*	.33*		
8 Number taught	.11	.09	.04	.02	.05	.05	.48*	

* = $p < .05$; ** = $p < .01$

NOTE: r was used for correlations between two continuous variables, r_{pb} was used for correlations between one dichotomous and one continuous variable, and r_{ϕ} was used for correlations between two dichotomous variables.

Older teachers were more likely than younger teachers to have engaged in additional ADHD training. Additional training was also more common in teachers with longer teaching

careers, and for teachers who had ever taught a student with ADHD, but was unrelated to the number of ADHD students taught. Furthermore, teachers who had engaged in additional ADHD training perceived their ADHD knowledge to be significantly higher than teachers without such training, and these teachers tended to score significantly higher on the actual knowledge questionnaire than did their non-trained counterparts.

6.3.4 Predicting Knowledge

Based on the literature, two sets of simple regressions were run to investigate the individual impact various factors had on teachers' (1) perceptions of their own knowledge about ADHD, and (2) actual ADHD knowledge. The predictors assessed were additional ADHD training, age, sex, years of teaching experience, ever taught a student with ADHD, number of ADHD students taught, and perceived or actual knowledge (the knowledge factor was dependent on which set of analysis was conducted). In order to avoid inflation of the family-wise error rate, each analysis reported below was assessed using an error rate of .01. Whilst this is not a true Bonferroni correction, it does provide partial protection against artificial inflation due to multiple comparisons.

For perceived knowledge, the regression analyses showed that additional training, having ever taught a student with ADHD, and actual knowledge significantly predicted perceived knowledge ratings (see Table 3). Moreover, additional training, having ever taught a student with ADHD, and perceived knowledge, significantly predicted teachers' actual knowledge about ADHD (see Table 4).

Table 3
Summary of Simple Regression Analyses Predicting Teachers' Perceived Knowledge of ADHD Ratings

Predictor	B	Constant	<i>t</i>	<i>p</i>
Additional training	1.37	7.11	3.20	.00
Age	0.03	3.72	1.35	.18
Sex	0.17	4.56	0.37	.71
Years teaching	0.05	3.98	2.30	.02
Ever taught a student with ADHD	1.63	6.68	3.17	.00
Number of ADHD students taught	0.07	4.73	1.05	.30
Actual knowledge	0.26	0.54	5.65	.00

Table 4
Summary of Simple Regression Analyses Predicting Teachers' Actual ADHD Knowledge

Predictor	B	Constant	<i>t</i>	<i>p</i>
Additional training	2.06	19.95	2.62	.01
Age	0.02	15.82	0.43	.67
Sex	0.30	16.80	0.36	.72
Years teaching	0.03	16.04	0.60	.55
Ever taught a student with ADHD	4.38	21.57	5.04	.00
Number of ADHD students taught	0.09	17.61	0.86	.39
Perceived knowledge	0.83	12.47	5.65	.00

6.3.5 Attitude Data: Descriptive Statistics

These results pertain to teachers' responses to items in section D of the ADHD questionnaire. Mean scores and standard deviations were calculated for each of the 31 individual attitude items, and were then tabulated. Table 5 sets out these descriptive statistics. A low mean score (ie., a score closer to 0) indicates that on average, participants agreed with that item, whereas a high mean score (ie., a score closer to 10) indicates that participants tended to disagree with the particular item. A mean score around five indicates that teachers did not have a strong belief for or against the particular item.

The order items appear in Table 5 is dependent on the items' mean score, with items with the lowest mean scores being presented at the beginning of the table, and items with higher mean scores being listed later. Inspection of Table 5 shows that item 7 was the most strongly agreed with item, suggesting that teachers generally perceive ADHD to be legitimate educational problem. Table 5 also shows that teachers tended to strongly agree with items 1 and 3 as well, showing that although teachers perceive ADHD to be a valid diagnosis, they also believe that the disorder is diagnosed too often.

Further inspection of Table 5 shows that item 14 was the most strongly disagreed with item, indicating that teachers generally believe that children with ADHD should be taught in the regular school system. Similarly, mean scores for items 25 and 19 were also relatively high, showing that teachers tended to disagree with the statements that managing the behaviour of ADHD students is easy, and that ADHD children misbehave because they are naughty. Finally, teachers did not appear to have a particularly positive or negative attitude toward items 9, 22, and 28.

Table 5
Descriptive Statistics for Each of the 31 Attitude Items

	Item	Mean	SD
7	ADHD is a legitimate educational problem	2.40	2.16
1	ADHD is a valid diagnosis	2.89	2.11
3	ADHD is diagnosed too often	3.08	2.49
6	Medications such as Ritalin and Dexamphetamine should only be used as a last resort	3.20	2.39
15	The extra time teachers spend with ADHD students is at the expense of students without ADHD	3.86	2.37
26	I have the skills to deal with ADHD children in my class	4.00	2.15
27	I have the ability to effectively manage ADHD students	4.04	1.93
8	Having an ADHD child in my class would disrupt my teaching	4.45	2.71
31	Other staff influence how I would manage a child with ADHD	4.50	2.40
22	ADHD children have little control over the way they behave	4.78	2.43
9	I would feel frustrated having to teach an ADHD child	5.11	2.55
28	I am limited in the way I manage ADHD students	5.24	2.32
30	Parents of ADHD students influence how I would manage a child with ADHD	5.26	2.57
16	Other students don't learn as well as they should when there is an ADHD child in the class	5.31	2.77
12	I would prefer to teach a student who was over-active than one who was inattentive	5.38	2.28
20	ADHD children cannot change the way they behave	6.25	2.26
4	ADHD is a behavioural disorder that should not be treated with medication	6.37	2.30
24	Students with ADHD are just as difficult to manage in the classroom as any student	6.54	2.39
13	Most students with ADHD don't really disrupt classes that much	6.60	1.91
17	You cannot expect as much from an ADHD child as you can from other children	6.73	2.60
5	All children with ADHD should take medication	6.80	2.22
29	My school has policies that regulate how teachers manage a child with ADHD	6.88	2.55
11	ADHD children should be taught by special education teachers	6.95	2.51
2	ADHD is an excuse for children to misbehave	7.14	2.43
21	ADHD students could do better if only they'd try harder	7.18	1.98
18	Children with ADHD could control their behaviour if they really wanted to	7.18	2.27
10	Young ADHD children should be treated more leniently than older ADHD children	7.30	1.96
23	ADHD children misbehave because they don't like following rules	7.39	2.11
25	Managing the behaviour of ADHD students is easy	7.59	1.76
19	ADHD children misbehave because they are naughty	7.70	2.02
14	Children with ADHD should not be taught in the regular school system	7.78	2.38

6.3.6 Attitude Data: Factor Analysis

A series of exploratory factor analyses (with varimax rotation) were conducted to investigate any links between the 31 attitude items contained in the questionnaire. With a criterion level of eigen values greater than 1, the most interpretable and parsimonious model contained a seven-factor solution. This model, which is reported below, explained 59.6% of the variance and communalities for each of the 31 items were greater than 0.5. Table 6 sets out the factor loadings for each of the items included in the final model. Four items (3, 12, 13, 20) did not load on any of these factors and therefore do not appear in Table 6.

Factor 1, *Lack of control*, indicated 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. *Negative classroom effects* (Factor 2), 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. Factor 3, *Diagnostic legitimacy*, indicated an acceptance of the diagnosis of ADHD. Whilst there was a belief that ADHD is diagnosed too often, there was a general consensus that ADHD is a valid and legitimate diagnosis

Factor 4, *Perceived competence*, showed that teachers believe they have the skills and ability to manage students with ADHD. *Influences to management* (factor 5) 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. The sixth factor, *Expectations* revealed that teachers hold some expectations about ADHD and the children with the condition. Finally, factor 7, *External control*, implied a belief that external agents (e.g., medication and policy) may be required in the management of ADHD.

Table 6
Factor Loadings in the Rotated Seven-Factor Solution

Item		Factor					
		Lack of control	Negative classroom effects	Diagnostic legitimacy	Perceived competence	Influences to management	Expectations
							External control
18	Children with ADHD could control their behaviour if they really wanted to	.767					
23	ADHD children misbehave because they don't like following rules	.742					
21	ADHD students could do better if only they'd try harder	.720					
17	You cannot expect as much from an ADHD child as you can from other children	.708					
25*	Managing the behaviour of ADHD students is easy	.649					
14	Children with ADHD misbehave because they are naughty	-.473					
15	Extra time teachers spend with ADHD students is at expense of students without ADHD		.808				
16	Other students don't learn as well when there is an ADHD student in the class		.767				
8	Having an ADHD child in my class would disrupt my teaching		.673				
11	ADHD children should be taught by special education teachers		.475				
9	I would feel frustrated having to teach an ADHD child		.463				
1*	ADHD is a valid diagnosis			.828			
2	ADHD is an excuse for children to misbehave			.696			
7*	ADHD is a legitimate educational problem			.682			
4	ADHD is a behavioural disorder that should not be treated with medication			.546			
27*	I have the ability to effectively manage ADHD students				.888		
26*	I have the skills to deal with ADHD children in my class				.882		
28	I am limited in the way I manage ADHD students				.661		
31	Other staff influence how I would manage a child with ADHD					.801	
30	Parents of ADHD students influence how I would manage a child with ADHD					.748	
24*	Students with ADHD are just as difficult to manage in the classroom as any student					.510	
17	You cannot expect as much from an ADHD child as you can from other children						.737
10	Young ADHD children should be treated more leniently than older ADHD children						.607
6	Medications such as Ritalin and Dexamphetamine should only be used as a last resort						-.590
5*	All children with ADHD should take medication						-.692
29	My school has policies that regulate how teachers manage a child with ADHD						.644
22	ADHD children have little control over the way they behave						.506

NOTE: Factor loadings <.4 are not displayed. * reverse scored item

6.3.7 Vignette Data: Classroom Management Strategies

This section provides the findings from Section C of the questionnaire, which asked teachers to read one of eight vignettes and then to answer a number of questions pertaining to that vignette. In total, 27 teachers read vignettes depicting a child with ADHD, combined type (Millee: $n = 15$; Michael: $n = 12$). Twenty-nine teachers read the vignette about a hypothetical child with ADHD, predominately hyperactive/impulsive type (Madeleine: $n = 12$; Brandon: $n = 17$). There were 33 teachers who read the vignette of an ADHD, predominately inattentive child (Kayla: $n = 21$; Kaleb: $n = 12$), and 31 who completed the control child vignette (Simone: $n = 17$; Simon: $n = 14$).

The percentage of teachers (with the total number of teachers in parenthesis) who correctly identified the ADHD status of the children depicted in each of the eight vignettes is presented in Table 7. This table also provides the percentage (and number) of teachers who incorrectly identified ADHD status, as well as those who were unsure (selected ‘don’t know’) about the child’s likely ADHD diagnosis. The data separate these findings across the four diagnostic categories for both female and male children (see Table 7).

Inspection of the total percentages in Table 7 shows that regardless of ADHD subtype, teachers were able to correctly identify ADHD status less than 50 percent of the time. When the diagnostic status of the hypothetical children was taken into account via a one-way ANOVA, it was found that the subtype was unrelated to teachers’ accuracy at *diagnosing* the child’s ADHD status. That is, the ANOVA was not significant, $F(2, 117) = 1.96, p = .15$.

Further inspection of Table 7 shows that teachers tended to have the most difficulty correctly identifying the male child (Kaleb) with symptoms of inattention only, and the female child (Madeleine) with symptoms of hyperactivity/impulsivity only. Moreover, Table 7 shows that teachers tended to be better at identifying the female child as not having ADHD than they were at identifying the non-ADHD status of the male child. To investigate whether there was statistically significant relationship between gender of child and teacher’s ability to

accurately identify ADHD status, a one-way ANOVA was conducted. Whilst the analysis was not significant, $F(2, 117) = 2.49, p = .09$, there was a trend showing that teachers tended to more accurately diagnose female than male children. Finally, Table 7 shows that across all four categories, teachers selected the unsure response more frequently than incorrectly identifying the ADHD status of the child.

Table 7
*Percentage of Accurate, Inaccurate, and Unsure Responses by Teachers (n=120) for Each of the Eight Vignettes**

ADHD subtype		N	Accurate	Inaccurate	Unsure
ADHD, Combined type	Millee	15	46.7% (n = 7)	0%	53.3% (n = 8)
	Michael	12	50% (n = 6)	8.3% (n = 1)	41.7% (n = 5)
	TOTAL	27	48.4% (n = 13)	3.7% (n = 1)	48.1% (n = 13)
ADHD, Predominately hyperactive/impulsive Type	Madeleine	12	33.3% (n = 4)	0%	66.7% (n = 8)
	Brandon	17	52.9% (n = 9)	0%	47.1% (n = 8)
	TOTAL	29	44.8% (n = 13)	0%	55.2% (n = 16)
ADHD, Predominately inattentive type	Kayla	21	42.9% (n = 9)	0%	57.1% (n = 12)
	Kaleb	12	25% (n = 3)	25% (n = 3)	50% (n = 6)
	TOTAL	33	36.4% (n = 12)	9.1% (n = 3)	54.5% (n = 18)
Normal/Typically developing	Simone	17	58.8% (n = 10)	0%	41.2% (n = 7)
	Simon	14	42.9% (n = 6)	0%	57.1% (n = 8)
	TOTAL	31	51.6% (n = 16)	0%	48.4% (n = 15)

* = total number of teachers in each category are presented in parenthesis

Individual strategies. For each of the 34 individual classroom management strategies, the percentage of teachers (and total number) who reported that they would use that particular strategy on the child depicted in the vignette presented to them was calculated and tabulated. These results are presented in Table 8. The most commonly selected strategy was strategy 16,

which was selected by 114 (95%) of the 120 participants. Strategy 14 was also selected frequently, with 105 (87.5%) teachers suggesting that they would use the strategy.

In contrast, the least commonly selected strategy was strategy 5, which was selected by 19 (15.8%) of the 120 teachers. No teachers reported that they intended to *take no action because the child was not really doing anything wrong* (strategy 32), or to *take no action because of being unsure about how to manage the child* (strategy 33).

Table 8
*Percentage of Teachers Who Reported That They Would Use the Classroom Management Strategy on the Child from the Vignette They Read**

	Classroom management strategy	%
1	Tell the child off for inappropriate behaviour – in front of the class	34.2 (n=41)
2	Tell the child off for inappropriate behaviour – privately	61.7 (n=74)
3	Keep the child in during play-time, lunch-time, or after school	25.8 (n=31)
4	Remove privileges such as free play, and class outings/excursions	35 (n=42)
5	Provide the child with extra work (e.g., writing lines or yard duty)	15.8 (n=19)
6	Planned ignoring – use ignoring as a strategy for inappropriate behaviour	39.2 (n=47)
7	Send the child into a designated area for a specified amount of time	40.8 (n=49)
8	Remove the child from the classroom for inappropriate behaviour	33.3 (n=40)
9	Bring in the child's parent(s)	75 (n=90)
10	Use a token system	66.7 (n=80)
11	Reward the child for appropriate behaviour (e.g., extra playtime)	61.7 (n=74)
12	Verbally praise the child for appropriate behaviour – in front of the class	80 (n=96)
13	Verbally praise the child for appropriate behaviour – privately	69.2 (n=83)
14	Organise class seating arrangements to minimise external distractions	87.5 (n=105)

Table 8 cont.

15	Use classroom rules	78.3 (n=94)
16	Give simple and clear instructions	95 (n=114)
17	Write instructions on the board	75.8 (n=91)
18	Allow this child to have frequent breaks during tasks	51.7 (n=62)
19	Ensure that the child is able to cope with each lesson	70.8 (n=85)
20	Lower the difficulty level of class assignments if necessary	78.3 (n=94)
21	Increase the attractiveness of assignments (e.g., use pictures and colours)	48.3 (n=58)
22	Work one to one with the child	54.2 (n=65)
23	Assign able students to help this child complete set work	41.7 (n=50)
24	Ask this child to help less able students with their work	34.2 (n=41)
25	Conduct activities with the child to increase self-esteem	65.8 (n=79)
26	Teach the child to their preferred learning style	47.5 (n=57)
27	Promote self-directed learning	39.2 (n=47)
28	Encourage the child to take risks in their learning	45.8 (n=55)
29	Provide counselling	33.3 (n=40)
30	Teach the child appropriate behaviour and rehearse it with them	55.8 (n=67)
31	Show the child care and attention	74.2 (n=89)
32	Take no action because the child is not really doing anything wrong	0
33	Take no action because I'm not sure how to manage this child	0
34	Other (<i>please specify</i>)	13.3 (n=17)

* = total number of teachers are presented in parenthesis

Seventeen of the 120 respondents selected the *Other* option and provided additional strategies they would use for the child depicted in the vignette they read. These responses were evenly distributed amongst the four diagnostic categories. Four of 17 responses were made for the vignette child with ADHD, combined type, three for the child with ADHD,

predominately inattentive type, 5 for the child with ADHD, predominately hyperactive/impulsive type, and 5 for the *normal* child.

The additional strategies suggested by teachers ranged from strategies like “Have the child assessed” and write a “Quick comment in child’s diary each day”, to more in-depth strategies such as one teacher’s response: “Discuss and perhaps implement successful strategies with previous teachers, set goals and reward achievement. Discuss strategies to assist the child which can be self-implemented. Gain support from others who work in the classroom to ensure consistency”. Finally, some responses were quite novel, such as “I have found the use of say caring for goldfish a good way to work with such children”. Refer to Appendix N to see each of the 17 verbatim responses made by teachers.

A 4 x 2 (vignette X yes/no) χ^2 analysis revealed that there was no significant association in regard to vignette type and frequency of intended use for any of the 34 classroom management strategies. That is, teachers’ intentions to use each of the 34 strategies were not significantly different across the four vignette types (3 ADHD subtypes and typically developing child). Therefore, data were collapsed across vignette type for all further analyses.

Obstacles perceived by teachers. Almost 50% of teachers (59/120) responded to item 41 which asked teachers to record “What may prevent you from implementing such strategies?” Four common themes emerged from these qualitative responses: time, equity within the classroom, class size, and parental involvement. A large proportion of teachers’ responses included time as a major factor in preventing them from using these strategies in the classroom. For example, “*Time – takes a lot of time to implement some of these and there’s already plenty of other issues that take up time*”; “*Time is my biggest problem*”; and “*Time is always the enemy, there is never enough*”.

Teachers were also concerned with unfairly spending more time with troubled students than with well-behaved children. Examples of teachers responses highlighting their

beliefs about equity within the class include *“Fairness to other children”*; *“Older children’s sense of justice and equality”*; *“I would try to help the child as much as I could so long as it doesn’t detract from the time and attention that the other 30+ children in the class need and deserve”*; and *“Not fair on other children, who may need/deserve same time but who don’t exhibit inappropriate behaviours”*.

Class size was another important factor that teachers believed would impact on their ability to perform the management strategies. For example, many teachers simply wrote *“Class size”* or *“The number of children in the grade”*, to indicate that large classes might prevent them from implementing the strategies they selected in the previous part of the questionnaire.

Finally, lack of parental involvement was a pertinent issue for teachers. When asked to comment on factors that might prevent teachers from implementing behavioural strategies in their classroom, teachers wrote things such as *“Lack of parental support”*; *“Lack of support from parents”*; and *“Parents’ insistence that the child work at the same level as others so she can pass the year”*. A list of all the verbatim qualitative responses regarding preventative obstacles is shown in Appendix O.

Five major strategies. Across the five strategy classes (reinforcement, negative consequences, planned ignoring, organising the classroom and curriculum, and emotional support), organising the classroom and curriculum was the most popular strategy selected by teachers, with 119 of the 120 teachers indicating that they would use this strategy if the child depicted in the vignette was a student in their class. At least one of the negative consequence strategies was selected by 109 of the 120 teachers. The next most popular strategy was reinforcement ($n = 107$), and then emotional support ($n = 99$). The least commonly selected strategy was planned ignoring, with only 47 teachers suggesting that they would use this strategy.

6.3.8 Attitude Toward the Strategies

Teachers' perceptions about the usefulness/benefit of using each of the five classroom management strategies were then assessed (see Table 9). In Table 9, a higher mean score represents a more positive attitude (toward the particular strategy in question). Table 9 shows that across the five strategies, teachers perceived organising the classroom and curriculum as the most useful and beneficial technique for managing the classroom behaviour of a student with ADHD. Teachers also perceived reinforcement and emotional support favourably. Whilst teachers did not see planned ignoring and negative consequences as particularly positive, they were not seen as negative either (see Table 9).

Table 9
Descriptive Statistics for Teachers' Attitudes Toward Each Classroom Management Strategy

Attitude domain	Mean	SD
Attitude toward reinforcement	8.21	1.46
Attitude toward negative consequences	4.51	2.60
Attitude toward planned ignoring	5.17	2.36
Attitude toward organising the classroom/curriculum	8.73	.96
Attitude toward emotional support	8.09	1.51

6.3.9 Testing the TRA and TPB

A series of 10 hierarchical multiple regression analyses were performed in order to explore the data further and to test the ability of the theories of reasoned action (TRA) and planned behaviour (TPB) to explain teachers' intention to engage in each of the five classroom management strategies. The dependent variable for the first set of five analyses was teachers' ($n=120$) intention to use each of the five classroom management strategies for the child depicted in the vignette they read. The predictors were entered in four separate blocks (1) attitude toward strategy, staff subjective norm, and parent subjective norm, (2) perceived control over use of strategy, (3) perceived knowledge ratings and actual knowledge scores, (4) factors 1 to 7 derived from the factor analysis conducted earlier on the attitude items (see section 6.3.6).

The second set of analyses assessed the intention of teachers ($n = 42$) who were currently teaching a student with ADHD to use each of the strategies on that student. Given the small sample size and the resultant difficulties inherent in multiple regression to accurately assess a larger number of predictors (see Tabachnick & Fidell, 2001), the additional variables analysed for the entire sample were not assessed for this sub-sample of teachers. Attitude toward strategy, staff subjective norm, and parent subjective norm were entered in block 1, and perceived control over use of strategy was entered in block 2.

6.3.10 Data Screening (n=120)

Data used to assess the TRA and the TPB for each of the 120 teachers were screened for missing values, and 34 instances were noted. Missing data were distributed across participants and items. Therefore, as suggested by Tabachnick and Fidell (2001), missing values were replaced with the average score for each of the variables.

The assumptions of multiple regression were assessed for each of the variables to be included in subsequent analyses. Normality was assessed descriptively by inspecting normal Q.Q. plots and detrended normal Q.Q. plots for each of the variables. Inspection of normal Q.Q. plots showed the observed scores on each of the variables closely resembled scores that would be expected in the population. The good match between observed and expected scores for each of the variables was shown by the dots closely approximating the diagonal lines, thus indicating normality. The detrended normal Q.Q. plots also indicated that each of the variables was normally distributed.

Normality was also assessed inferentially using calculations of skewness and kurtosis and the Kolmogorov-Smirnov Lilliefors (K-S) test. Skewness and kurtosis were acceptable for each of the variables. Linearity was assessed descriptively using scatterplots of the dependant variables (intention to use the strategy) with each of the predictor variables. The scatterplots showed that the scores approximated a straight line. Homoscedasticity was assessed descriptively using scatterplots of the residual values. These plots showed that the

residual values were randomly scattered, indicating that the assumption of homoscedasticity had been met.

The assumption that scores are independent of one another (ie., sequential error) was met, with all of the Durbin-Watson statistics approximated two: 1.80 (reinforcement), 1.95 (negative consequences), 1.64 (planned ignoring), 1.95 (classroom/curriculum), 1.81 (emotional support). Finally, measures of Mahalanobis and Cooks distance did not reveal the presence of any extreme outliers.

6.3.11 Strategies Teachers Intend to Use (n=120): Further Testing the TRA and TPB

Five hierarchical multiple regression analyses were performed to investigate predictors to teachers' ($n=120$) intention to perform each of the five behaviour management strategies. The five separate analyses were based on the strategies that teachers' said they would use if the hypothetical child depicted in the vignette they read was a student in their class. Each of the analyses began with an examination of the TRA, that is, the ability of attitude toward the strategy, and staff and parent subjective norm scores, to predict intention to perform the strategy. These analyses therefore included three predictor variables and 120 cases. The TPB was then assessed by adding perceived control over the use of the strategy to the regression equation. Teachers' scores on perceived and actual ADHD knowledge were then entered into the regression model. Finally, the seven factors extracted from the earlier factor analysis on teachers' attitudes toward ADHD were entered together to assess their ability to predict behavioural intention. Only the first analysis, which assessed teachers' intention to use reinforcement, is explained in detail below. For simplicity, the remaining four analyses are described in less detail.

Reinforcement. The first step of this four-step regression model assessed the TRA and showed that together, the three predictors (attitude, staff subjective norm, and parental subjective norm) accounted for a significant proportion of the variance in behavioural intention, $R^2 = .12$, $F(3, 116) = 5.21$, $p = .002$. This suggests that a teacher is more likely to

intend to use reinforcement if they have a positive attitude toward reinforcement and believe that other staff and parents of children with ADHD are likely to support their use of reinforcement strategies. However, none of these predictors alone significantly impacted on teachers' intention to perform reinforcement (see Table 10).

Further inspection of Table 10 shows that the second step of the regression analysis, the addition of perceived control, significantly increased the predictability of teachers' intention to engage in reinforcement, $R^2_{\text{change}} = .05$, $F_{\text{change}}(6, 113) = .16$, $p = .014$. That is, the TPB significantly accounts for approximately 4.3% more in teachers' intention to engage in reinforcement strategies than does the TRA (see Table 10).

When perceived knowledge ratings and actual knowledge scores were entered into the model during the third step, the model was not significantly improved (see Table 11). None of the seven factors entered at step 4 provided a significant improvement to the regression model either (refer to Table 10).

Table 10

Summary of Regression Analyses for Prediction of Teachers' Intention to Use Reinforcement Strategies

Predictor	R^2 ^a	SigF ^b	β ^c	sr ²	<i>p</i>
Step 1	.12	.002			
Attitude toward reinforcement			.04	.001	.728
Teacher subjective norm			.14	.007	.333
Parental subjective norm			.22	.022	.095
Step 2	.05	.014			
Perceived control			.25	.043	.021
Step 3	.00	.856			
Perceived knowledge			.02	.000	.862
Actual knowledge			.04	.001	.704
Step 4	.01	.987			
Factor 1			.00	.001	.972
Factor 2			.10	.001	.445
Factor 3			.06	.005	.569
Factor 4			.06	.003	.531
Factor 5			.02	.003	.843
Factor 6			.01	.000	.936
Factor 7			.01	.000	.917

Note: ^a Results for R^2_{change} relate to the regression equation formed after each step. ^b Sig *F* relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and *p* for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

Negative consequences. This analysis examined a four-step model to predict teachers' intention to perform negative consequences. Step 1 was significant, $R^2 = .14$, $F(3, 116) = 6.20$, $p < .001$, indicating that attitude, staff subjective norm, and parental subjective norm together significantly predicted teachers' intention to use negative consequences (see Table 11). However, Table 11 shows that attitude toward negative consequences alone significantly predicted teachers' intention to use negative consequences, with 5.4% of the variance being explained by this single predictor. Entering perceived control at step 2 did not significantly improve the predictive ability of the model, and the addition of perceived and actual knowledge at step 3 did not significantly increase the model's predictability either (see Table 11). Finally, Table 11 shows that entering factors one through seven (step 4) offered a significant improvement to the model, and the unique contribution of the individual factors showed that factor seven was significant. This factor explained 4.5% of the variance in teachers' intention to use negative consequences (refer to Table 11).

Table 11
Summary of Regression Analyses for Prediction of Teachers' Intention to Use Negative Consequence Strategies

Predictor	R^2 ^a	SigF ^b	β ^c	sr ²	p
Step 1	.14	.000			
Attitude toward negative conseq			.27	.054	.007
Teacher subjective norm			.03	.001	.789
Parental subjective norm			.13	.008	.289
Step 2	.00	.987			
Perceived control			.02	.000	.857
Step 3	.03	.186			
Perceived knowledge			.13	.010	.232
Actual knowledge			.12	.010	.239
Step 4	.08	.017			
Factor 1			.17	.013	.186
Factor 2			.09	.004	.453
Factor 3			.00	.000	.988
Factor 4			.00	.000	.973
Factor 5			.00	.000	.975
Factor 6			.09	.005	.396
Factor 7			.22	.045	.015

Note: ^a Results for R^2 change relate to the regression equation formed after each step. ^b Sig F relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and p for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

Planned ignoring. This analysis examined teachers' intention to use planned ignoring. The variables entered at step 1 significantly predicted teachers' intention to engage in planned ignoring, $R^2 = .07$, $F(3, 116) = 2.77$, $p = .045$. However, none of the individual predictors entered at step 1 offered a significant contribution to intention (refer to Table 12). The addition of perceived control at step 2 significantly improved the model's ability to predict behavioural intention, $R^2_{\text{change}} = .05$, $F_{\text{change}}(4, 115) = 7.09$, $p = .009$, with this predictor explaining 6.7% of the variance in teachers' intention to use planned ignoring. Adding perceived and actual knowledge at step 3 did not significantly improve the regression model. Together, factors one through seven did not offer to explain a significant amount more of the variance. However, factor seven was significant and alone explained 4.4% of the variance in teachers' intention to use planned ignoring (see Table 12).

Table 12

Summary of Regression Analyses for Prediction of Teachers' Intention to Use Planned Ignoring Strategies

Predictor	R^2 ^a	SigF ^b	β ^c	sr ²	p
Step 1	.07	.045			
Attitude toward planned ignoring			.08	.004	.470
Teacher subjective norm			.08	.003	.553
Parental subjective norm			.13	.007	.329
Step 2	.05	.009			
Perceived control			.30	.067	.004
Step 3	.01	.573			
Perceived knowledge			.01	.000	.911
Actual knowledge			.09	.005	.419
Step 4	.06	.302			
Factor 1			.16	.013	.199
Factor 2			.12	.006	.359
Factor 3			.06	.002	.581
Factor 4			.08	.005	.438
Factor 5			.03	.001	.779
Factor 6			.06	.002	.600
Factor 7			.22	.044	.018

Note: ^a Results for R^2_{change} relate to the regression equation formed after each step. ^b Sig F relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and p for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

Organising the classroom and curriculum. This analysis examined teachers' intention to use organising the classroom and curriculum strategies. Step 1 of the analysis was significant, $R^2 = .08$, $F(3, 116) = 3.58$, $p = .016$, indicating that these predictors together significantly predicted teachers' intentions to engage in these strategies. However, inspection

of Table 13 shows that individually, none of these predictors alone offered a significant contribution to the regression model. The addition of perceived control at step 2 provided a significant improvement to the model, $R^2_{\text{change}} = .03$, $F_{\text{change}}(4, 115) = 3.95$, $p = .049$. This variable alone contributed 3.3% to the prediction of teachers' intention to use classroom and curriculum-related strategies. The remaining two steps in this analysis did not significantly improve the regression model, and none of the nine predictors entered during these steps offered a significant amount of unique predictability (refer to Table 13).

Table 13

Summary of Regression Analyses for Prediction of Teachers' Intention to Use Organising the Classroom and Curriculum Strategies

Predictor	R^2 ^a	SigF ^b	β ^c	sr ²	<i>p</i>
Step 1	.08	.016			
Attitude toward classrrom/curr			.03	.025	.776
Teacher subjective norm			.04	.001	.772
Parental subjective norm			.13	.008	.315
Step 2	.03	.049			
Perceived control			.23	.033	.043
Step 3	.02	.253			
Perceived knowledge			.06	.002	.603
Actual knowledge			.14	.012	.210
Step 4	.03	.759			
Factor 1			.08	.003	.507
Factor 2			.12	.007	.336
Factor 3			.07	.003	.524
Factor 4			.03	.001	.795
Factor 5			.14	.011	.235
Factor 6			.01	.000	.928
Factor 7			.00	.000	.986

Note: ^a Results for R^2_{change} relate to the regression equation formed after each step. ^b Sig *F* relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and *p* for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

Emotional support. This analysis examined teachers' intention to use emotional support in the classroom management of students' behaviour problems. Table 14 shows that entering the three TRA variables in step 1 was statistically significant, $R^2 = .07$, $F(3, 116) = 2.94$, $p = .036$. However, none of the three variables offered a statistically significant unique contribution to the final regression model. The remaining three steps (2-4) were not significant, and none of the predictors entered at these steps contributed alone significantly to the final regression model (see Table 14).

Table 14
Summary of Regression Analyses for Prediction of Teachers' Intention to Use Emotional Support Strategies

Predictor	R ² ^a	Sig F ^b	β ^c	sr ²	<i>p</i>
Step 1	.07	.036			
Attitude toward emotional support			.08	.004	.449
Teacher subjective norm			.02	.000	.885
Parental subjective norm			.03	.000	.824
Step 2	.01	.218			
Perceived control			.15	.014	.178
Step 3	.02	.229			
Perceived knowledge			.01	.000	.921
Actual knowledge			.16	.017	.139
Step 4	.07	.221			
Factor 1			.08	.053	.546
Factor 2			.15	.012	.218
Factor 3			.05	.002	.625
Factor 4			.08	.005	.442
Factor 5			.10	.005	.422
Factor 6			.09	.005	.432
Factor 7			.10	.009	.291

Note: ^a Results for R²change relate to the regression equation formed after each step. ^b Sig F relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and *p* for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

6.3.12 Data Screening (n=42)

These data relate only to teachers who were currently teaching a student with ADHD. Responses to the items assessing teachers' intention to use the five management strategies for one of their students with ADHD were screened for missing data. There were two cases of missing data, which were subsequently replaced with the average score for the two variables in question.

The assumptions of multiple regression were then assessed for the variables to be included in the analyses: intention to perform each of the behaviour management strategies in the following week; attitude toward each strategy, teacher and parent subjective norm measures for each of the strategies, and perceptions of control for each strategy.

Inspection of normal Q.Q. plots and detrended normal Q.Q. plots for each of the variables indicated that the data were normally distributed. Normality was also assessed inferentially by calculating values for skewness and kurtosis, and these values provided acceptable levels for each of the variables. Linearity was assessed descriptively using scatterplots of the dependant variables (intention to use the strategy during the next week) with each of the predictor variables, and these plots showed that the assumption of linearity

was met. Homoscedasticity was not a problem either, with scatterplots of the residual values being randomly scattered.

The assumption of sequential error was met, with all of the Durbin-Watson statistics approximated two: 2.04 (reinforcement), 1.89 (negative consequences), 2.06 (planned ignoring), 2.22 (classroom/curriculum), 1.68 (emotional support). No outliers were revealed according to measures of Mahalanobis and Cooks distance

6.3.13 Strategies Teachers Intend to Use ($n=42$): A Final Test of the TRA and TPB

Five multiple regression analyses were performed to assess the TRA and TPB in terms of their ability to account for teachers' (who were currently teaching a student with ADHD; $n=42$) intention to perform each of the five strategies during the next week to manage the behaviour of a student with ADHD.

Reinforcement. The first step in this analysis examined the TRA in terms of the theory's ability to predict teachers' intention to use reinforcement to manage the behaviour of a student with ADHD during the next week. This step was not significant, $R^2 = .04$, $F(3, 36) = .51$, $p = .680$, indicating that teachers' attitude toward reinforcement, and their staff and parental subjective norm scores, did not significantly predict teachers' intention to engage in reinforcement strategies. Furthermore, Table 16 shows that none of the individual TRA predictors offered a significant unique contribution to the prediction of teacher's intention to use reinforcement strategies. Finally, the regression model was not significantly improved with the addition of perceived control at step 2 (see Table 15).

Table 15

Summary of Regression Analysis for Prediction of Teachers' Intention to Use Reinforcement Strategies During the Next Week

Predictor	R^2 ^a	SigF ^b	β ^c	sr ²	p
Step 1	.04	.680			
Attitude toward reinforcement			.02	.000	.898
Teacher subjective norm			.27	.028	.299
Parental subjective norm			.32	.037	.232
Step 2	.09	.059			
Perceived control			.33	.094	.059

Note: ^a Results for R^2 change relate to the regression equation formed after each step. ^b Sig F relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and p for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

Negative consequences. This analysis examined a two-step model to predict teachers' intention to use negative consequences during the next week to manage the behaviour of a student with ADHD. Step 1 was significant, $R^2 = .43$, $F(3, 36) = 9.15$, $p < .001$, illustrating that together, attitude toward negative consequences and staff and parent subjective norm, account for a significant proportion of the variability in teachers' intention to use negative consequences in the classroom management of ADHD. However, attitude toward negative consequences was the only TRA predictor to alone offer a significant unique contribution to the prediction of intention, with this predictor explaining 39.6% of the variance in teachers' intention to use negative consequence for a student with ADHD during the next week (see Table 16). Finally, Table 16 shows that entering perceived control at step 2 did not significantly improve the predictive ability of the model.

Table 16

Summary of Regression Analysis for Prediction of Teachers' Intention to Use Negative Consequent Strategies During the Next Week

Predictor	R^2 ^a	SigF ^b	β ^c	sr ²	p
Step 1	.43	<.001			
Attitude toward negative cons			.68	.396	<.001
Teacher subjective norm			.16	.014	.330
Parental subjective norm			.04	.001	.828
Step 2	.05	.077			
Perceived control			.24	.049	.077

Note: ^a Results for R^2 change relate to the regression equation formed after each step. ^b Sig F relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and p for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

Planned ignoring. Teachers' intention to use planned ignoring during the next week was examined in this regression model. The first step of the model was significant, $R^2 = .27$, $F(3, 36) = 4.41$, $p = .010$, indicating that teachers' intention to use planned ignoring can be predicted by teachers' attitude toward planned ignoring and teacher and parent subjective norms. Inspection of the squared semi-partial correlations for each these three variables (see Table 17), show that only attitude toward planned ignoring offered a significant unique contribution to the model, explaining 17.6% of the variance in teachers' intention to use this strategy. Step 2, the addition of perceived control, added significantly to the predictive ability

of the model, $R^2_{\text{change}} = .10$, $F_{\text{change}}(4, 35) = 5.72$, $p = .022$. Perceived control alone explained 10.3% of the variance in teachers' intention to use planned ignoring strategies during the next week (refer to Table 17).

Table 17

Summary of Regression Analysis for Prediction of Teachers' Intention to Use Planned Ignoring Strategies During the Next Week

Predictor	R^2 ^a	SigF ^b	β ^c	sr ²	p
Step 1	.27	.010			
Attitude toward planned ignoring			.43	.176	.004
Teacher subjective norm			.21	.023	.269
Parental subjective norm			.19	.019	.316
Step 2	.10	.022			
Perceived control			.33	.103	.022

Note: ^a Results for R^2_{change} relate to the regression equation formed after each step. ^b Sig F relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and p for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

Organising the classroom and curriculum. This analysis examined teachers' intention to use organising the classroom and curriculum strategies during the next week. The first step of the model was not significant, with none of the predictors offering a significant contribution to the model (see Table 18). Adding perceived control (step 2) significantly improved the model, $R^2_{\text{change}} = .11$, $F_{\text{change}}(4, 35) = 4.79$, $p = .035$, with 11.3% of the variance in teachers' intention to engage in strategies indicative of organising the classroom and curriculum being accounted for by perceptions of control over the use of these strategies.

Table 18

Summary of Regression Analysis for Prediction of Teachers' Intention to Use Organising the Classroom and Curriculum Strategies During the Next Week

Predictor	R^2 ^a	SigF ^b	β ^c	sr ²	p
Step 1	.06	.504			
Attitude toward classroom/curr			.10	.007	.579
Teacher subjective norm			.22	.018	.386
Parental subjective norm			.20	.012	.475
Step 2	.11	.035			
Perceived control			.41	.113	.035

Note: ^a Results for R^2_{change} relate to the regression equation formed after each step. ^b Sig F relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and p for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

Emotional support. Teachers' intention to use emotional support to manage the behaviour of a student with ADHD during the next week was examined in this analysis. Step

1 of the model was not significant, and none of the three variables entered offered a significant unique contribution to the final model (refer to Table 19). The addition of perceived control at step 2 significantly improved the model, $R^2_{\text{change}} = .14$, $F_{\text{change}}(4, 35) = 7.02$, $p = .012$. Table 19 shows that 13.8% of the variance in teachers' intention to use emotional support strategies during the next week was accounted for by teachers' perceptions of control.

Table 19
Summary of Regression Analysis for Prediction of Teachers' Intention to Use Emotional Support Strategies During the Next Week

Predictor	R^2 ^a	SigF ^b	β ^c	sr ²	p
Step 1	.18	.069			
Attitude toward emotional support			.14	.013	.421
Teacher subjective norm			.28	.029	.235
Parental subjective norm			.32	.038	.171
Step 2	.14	.012			
Perceived control			.44	.138	.012

Note: ^a Results for R^2_{change} relate to the regression equation formed after each step. ^b Sig F relates to the significance of the change in the regression equation formed after each step. ^c β , sr², and p for individual predictors are the values for the variables in the final regression model. sr² = squared semi-partial correlation.

6.4 Summary and Suggestions

This chapter has provided details about primary school teachers' knowledge about, and attitudes toward, ADHD, as well as the interrelationships between these variables and others such as age, sex, teaching experience, and additional ADHD training.

6.4.1 Optimistic Bias

It was shown that teachers generally perceived their own knowledge of ADHD to be significantly lower than their actual knowledge was shown to be on the ADHD knowledge questionnaire, and this was more pronounced for younger and less experienced teachers. This finding is in the opposite direction than expected, and therefore has important implications for research in the area of optimistic bias. This difference might mean that some variables are not amenable to explanation via the optimistic bias framework, or more plausibly that the variables assessed in the current study (perceived and actual knowledge) differ significantly to variables assessed in the literature. Most past empirical investigations of optimistic bias have

assessed people's beliefs about some future risk or behaviour they may experience and compared that to an average risk *score* within the subjects' peer population, whereas the current study assessed teachers' own scores on measures of perceived and actual knowledge. Therefore, methodological differences between past research and the current study may explain why the optimistic bias paradigm was not supported. Nonetheless, further research is necessary to determine the accuracy of this hypothesis.

6.4.2 Teacher Characteristics

The results also showed that teachers with greater years of teaching experience did not score significantly higher on actual knowledge than the less experienced teachers. Further, as would be expected, older teachers and those with greater years of teaching experience were more likely than younger and less experienced teachers, to have ever taught a student with ADHD, respectively.

Both perceived and actual knowledge about ADHD tended to be highest for teachers who had had experience with teaching a student with ADHD, and for those who had engaged in additional ADHD training. Finally, additional training was more common in older teachers, those with longer teaching careers, and for teachers who had ever taught a student with ADHD. However, training was unrelated to the number of ADHD students taught.

The simple regression analyses to predict knowledge showed that perceived knowledge was significantly predicted by additional training, ever taught a student with ADHD, and actual knowledge scores, and actual knowledge was also significantly predicted by additional training and years of teaching experience, as well as perceived knowledge.

6.4.3 Factor Analysis

The exploratory factor analysis of teachers' attitudes toward ADHD revealed a seven-factor solution, which explained 59.6% of the variance. Of the 31 items entered into the analysis, all had communalities greater than .5, and 27 loaded significantly on one of the seven factors included in the final solution. The seven factors were; lack of control, negative

classroom effects, diagnostic legitimacy, perceived competence, influences to management, expectations, and external control.

6.4.4 Vignettes

Teachers were not highly accurate at diagnosing hypothetical children with ADHD (as depicted in the vignettes). However, they tended to select ‘Don’t Know’ more often than incorrectly diagnosing the child depicted in the vignette. There were no significant differences in teachers’ accuracy across the different diagnostic subtypes or genders contained in the vignettes. Furthermore, of the five classroom management strategies assessed, teachers tended to hold the most positive attitude toward organising the classroom and curriculum, and the least favourable attitude toward negative consequences.

6.4.5 TRA and TPB

The multiple regression analyses for the entire sample of 120 teachers showed that the TRA was able to significantly predict teachers’ intention to use each of the five classroom management strategies. Furthermore, the TPB offered a significant improvement over the TRA for only three of the five strategies – reinforcement, planned ignoring and organising the classroom and curriculum. However, the TPB was only just significantly better than the TRA with regard to predicting teachers intent to use organising the classroom and curriculum ($p = .049$). Further, perceived behavioural control was the sole significant predictor for teachers’ intent to use reinforcement and organising the classroom and curriculum. Factor seven and perceived behavioural control offered significant unique contributions to the prediction of teachers’ intent to use planned ignoring.

None of the predictor variables entered during the regression analyses offered significant unique contributions to the prediction of teachers’ intention to use emotional support. Finally, with regard to negative consequences, the multiple regression analyses showed that while the TPB did not add a significant amount of predictability over the TRA model, two predictors (attitude and factor seven) offered significant unique contributions to

the overall model. That is, teachers' intention to use negative consequences was significantly related to their attitude toward these strategies as well as a belief that external agents such as medication and policy may be required in the management of ADHD. This latter finding suggests that teachers perceive the use of negative consequences as being outside of their level of skill, opportunity, and resources. Given that the TPB is significantly better than the TRA at predicting intention of behaviours perceived as requiring a degree of skill, opportunity, and resources (Conner & Armitage, 1998), it therefore makes theoretical sense that the TPB did not add significantly to the TRA in terms of predicting teachers' intention to use negative consequences to manage the behaviour of students with ADHD.

Knowledge did not significantly impact on teachers' intention to engage in any of the management strategies. Finally, while the seven factors derived from the earlier factor analysis on attitude data together, significantly predicted teachers' intention to use negative consequences, factor seven was the only one to offer a significant unique contribution to the model. Factor seven also offered a unique predictive contribution to teachers' intention to use planned ignoring. None of the remaining six factors significantly impacted on the final regression model for any of the strategies.

For the sub-sample of teachers ($n = 42$) who were currently teaching a student with ADHD, multiple regression analyses showed that the TRA was significantly able to predict teachers' intent to use negative consequences and planned ignoring. Further, the TPB offered a significant improvement over the TRA for planned ignoring, organising the classroom and curriculum and emotional support. Neither the TRA nor the TPB significantly predicted teachers' intention to use reinforcement strategies. These findings differ to those reported for the entire sample of teachers, and therefore indicate the predictive utility of the TRA and TPB differ across teachers who currently teach a student with ADHD and those who do not. Possible reasons for this discrepancy and suggestions for future research are discussed in chapter 10 (see section 10.2.6).

CHAPTER 7: STUDY 2

AN EXPLORATION OF THE BEHAVIOUR MANAGEMENT STRATEGIES USED BY TEACHERS WHOM CURRENTLY TEACH A STUDENT WITH ADHD

7.1 Overview

This chapter provides the methodology and results for the two phases of Study 2. Phase one involved an exploratory investigation into the strategies used by primary school teachers in the classroom to manage the behaviour of a student with ADHD. The second phase involved a more in-depth investigation of the strategies used by teachers to manage these children. In phase 1, teachers were asked to record the number of times they used each of the five behaviour management strategies described in chapter 6 over a one-week period by keeping a tally. In phase 2, teachers were asked to record the actual strategies they used over a one-week period to manage the behaviour of a student with ADHD, including the antecedents and consequences for each strategy used. This chapter describes the methods and results for each phase and concludes with a discussion of the results from the two phases.

7.2 Phase 1: Method

7.2.1 Participants

A sub-sample of 25 (17 female, 8 male) of the 120 teachers used in Study 1 completed an additional activity which involved them recording the types of strategies they used in their classroom over a one-week period to manage the behaviour of a child with ADHD (referred to hereafter as the classroom management recording sheet). Each of the 25 participants was currently teaching a student with ADHD. The mean age for these 25 teachers was 40.7 years ($SD = 9.4$ years). Eighteen participants (13 female, 5 male) taught in Catholic schools, and seven (4 female, 3 male) taught in private schools.

7.2.2 Materials

The classroom management recording sheet detailed in section 5.3 was used to assess the number of times teachers reportedly used each of the five classroom behaviour management strategies: reinforcement, negative consequences, planned ignoring, organising

the classroom and curriculum, and emotional support, over a one-week period (see Appendix I). This sheet asked teachers to record the strategies they had used over that period to manage the behaviour of a student with ADHD in their class. Teachers placed a tick in the respective column for each strategy each time one of them was used.

7.2.3 Procedure

The classroom recording sheet was included in the package given to teachers for Study 1. Instructions were included in this package that the recording sheet was to be completed only by teachers who currently had a student with ADHD in their class. As stated in chapter 4, the researcher returned to each of the 16 primary schools to collect completed recording sheets approximately two weeks after initially delivering the questionnaires packages.

7.3 Phase1: Results

7.3.1 Response Rates

Of the 42 teachers who were currently teaching a student with ADHD, 25 teachers completed and returned the classroom recording sheet, giving a response rate of 59.5%.

7.3.2 Demographic Information

Of the 25 participants who completed the classroom recording sheet, nine held a Bachelors Degree, three held a Teaching Diploma, and eleven held both a Bachelors Degree and a Diploma. One teacher held a Masters Degree, and one participant failed to record a response to this item. Teaching experience ranged from one to 30 years, with a mean of 16.0 years ($SD = 9.0$ years). There were no significant differences in terms of age, sex, or teaching experience between this sub-sample of 25 participants and the remaining 95 participants from Study 1 who did not complete the classroom recording sheet.

Data collected for the students with ADHD ($n = 25$), showed that 8 were in junior levels (prep, 1, 2), 10 in middle school grades (3,4), and 7 in the senior grade levels (5,6). The ages of the students with ADHD ranged from 6 to 13 years, with an average of 9.2 years ($SD = 2.1$ years). Twenty-two of the ADHD students were male and three were female. Finally, 22

of the 25 ADHD students referred to in phase two were reportedly currently taking medication as a treatment for ADHD.

7.3.3 Descriptive Data

The number of ticks recorded for each strategy was tallied and descriptive statistics were calculated. These data appear in Table 20. Inspection of this table shows that the most commonly reported strategy was reinforcement, with an average of 7.88 ($SD = 6.29$) instances of this strategy being used per teacher over the week. On the other hand, the least commonly used strategy was planned ignoring ($M = 2.12$, $SD = 4.10$)

Table 20
Descriptive Statistics for Self-Reported Usage of the Five Management Strategies

Strategy	Mean	SD
Reinforcement	7.88	6.29
Organising classroom/curriculum	4.84	4.79
Negative consequences	3.40	3.54
Emotional support	2.96	2.49
Planned ignoring	2.12	4.10

7.3.4 T-Tests

A series of 10 repeated-measures *t*-tests were conducted to assess if any of the five strategies were used significantly more often than another strategy. Due to the use of multiple comparisons, an adjusted error rate of .005 was used to assess statistical significance across the analyses. Under this more stringent probability level, three significant results were shown. On average, teachers used reinforcement significantly more frequently than either negative consequences, planned ignoring, or emotional support (see Table 21). No other comparisons were significant.

Table 21
Significant t-test Results for Self-Reported Usage of the Five Management Strategies

Strategy	<i>t</i>	<i>df</i>	<i>p</i>
Reinforcement & Negative consequences	4.43	24	.001
Reinforcement & Planned ignoring	5.65	24	.001
Reinforcement & Emotional support	4.37	24	.001

7.3.5 Correlation Analyses

Five, one-tailed Pearson correlation analyses were carried out to investigate the relationships between the four TPB predictors (attitude, subjective norm, perceived control, and intention) and each of the five behaviour management strategies. The results of these analyses are provided in Tables 22 to 26.

The first correlation analysis assessed the relationship between the TPB predictors and teachers' use of reinforcement strategies over a one-week period for a student with ADHD. The results of this analysis are presented in Table 22, and show that attitude toward reinforcement and perceived control were significantly correlated, and so were the teacher and parent subjective norm measures.

Table 22
Correlation Coefficients for Use of Reinforcement Strategies

	Behaviour	Attitude	Teacher norm	Parent norm	Perceived control
Attitude	.07				
Teacher norm	.07	.22			
Parent norm	.00	.21	.77**		
Perceived control	.04	.54**	.07	.09	
Intention	.23	.26	.18	.09	.27

** = $p < .01$

Teacher norm and parent norm were significantly correlated with teachers' intention to engage in each of the remaining four behaviour management strategies as well (see Tables 23-26). Teachers' attitude toward both negative consequences and planned ignoring were significantly correlated with teachers' intention to perform these strategies (see Table 23 & 24, respectively). Furthermore, Table 25 shows that teachers' attitude toward organising the classroom and curriculum strategies was significantly correlated with parent norm, perceived control and teachers' intention to use these strategies. Finally, perceived control and intention were significantly correlated with teachers' reported use of strategies indicative of both organising the classroom and curriculum (see Table 25) and emotional support (see Table 26).

Table 23

Correlation Coefficients for Use of Negative Consequence Strategies

	Behaviour	Attitude	Teacher norm	Parent norm	Perceived control
Attitude	.20				
Teacher norm	.01	.11			
Parent norm	.01	.12	.48*		
Perceived control	.05	.24	.11	.08	
Intention	.14	.63**	.26	.31	.19

* = $p < .05$; ** = $p < .01$

Table 24

Correlation Coefficients for Use of Planned Ignoring Strategies

	Behaviour	Attitude	Teacher norm	Parent norm	Perceived control
Attitude	.10				
Teacher norm	.06	.12			
Parent norm	.09	.26	.59**		
Perceived control	.06	.04	.01	.21	
Intention	.15	.53**	.06	.22	.21

** = $p < .01$

Table 25

Correlation Coefficients for Use of Organising the Classroom and Curriculum Strategies

	Behaviour	Attitude	Teacher norm	Parent norm	Perceived control
Attitude	.23				
Teacher norm	.13	.15			
Parent norm	.06	.45*	.73**		
Perceived control	.26	.50*	.03	.25	
Intention	.28	.51**	.19	.10	.60**

* = $p < .05$; ** = $p < .01$

Table 26

Correlation Coefficients for Use of Emotional Support Strategies

	Behaviour	Attitude	Teacher norm	Parent norm	Perceived control
Attitude	.32				
Teacher norm	.25	.26			
Parent norm	.39	.36	.78**		
Perceived control	.38	.31	.10	.24	
Intention	.34	.28	.07	.08	.58**

** = $p < .01$

7.4 Phase 2: Method

7.4.1 Participants

A sub-sample of 12 (10 female, 2 male) of the 120 teachers from Study 1 was used for the second phase of Study 2. Of the 12 participants, 9 taught in the Catholic school system (7 female, 2 male), and 3 taught in private schools (3 female). Participant's ages ranged from 25 to 55 years, with a mean age of 42.3 years ($SD = 10.8$ years).

7.4.2 Materials

The behaviour management strategy recording diary detailed in section 5.6 was used in assess (a) the types of strategies teachers use in the classroom management of students with ADHD, and (b) teacher's ability to correctly identify the types of strategies they use (see Appendix I).

7.4.3 Procedure

Eight months after phase 1 was conducted and the data analysed, the author telephoned each of the 16 schools who participated in Study 1 and asked the principal to ask teachers at the next staff meeting if they would complete an additional recording sheet if they currently had a child with ADHD in their class (i.e., behaviour management strategy recording diary). The researcher telephoned the principal of each school approximately one week after the initial call to ask if there were any teachers who were willing to complete the additional behaviour diary. Twenty-four teachers agreed to complete the diary. A copy of this diary, along with instructions about how to complete it, was sent to teachers who agreed to participate in this phase of the study. Teachers were also provided with a stamped, researcher-addressed envelope, and were asked to return their completed diary in the mail.

In relation to a child with ADHD in their class, the sub-sample of teachers were asked to write down (i) the strategy they used (i.e., what they did), (ii) why they used that particular strategy (i.e., what the child had done to warrant *action*), and (iii) what the outcome of using that strategy was. Teachers were also asked to tick a box to indicate which one of the five

strategies they had just used. Teachers were asked to record the answers to these questions for a one-week period each time they used one of the five management strategies for a student with ADHD.

7.5 Phase 2: Results

7.5.1 Response Rates

Of the 24 diaries sent out in the mail, 13 were returned. One diary was not useable because of substantial missing data, which left a useable response rate of 50%.

7.5.2 Demographic Information

Of the 12 teachers who adequately completed the second phase of the study, five held a Bachelors Degree, one held a Teaching Diploma, and six held both a Bachelors Degree and a Teaching Diploma. During phase two, six teachers were teaching junior grade levels (prep, grades 1 & 2), four taught middle school grade levels (grades 3 & 4), and two taught in the senior grades (grades 5 & 6). The duration of teaching experience for these 12 teachers ranged from 2 to 31 years, with average teaching experience being 19 years ($SD = 9.7$ years). Average years of teaching experience for the samples used in phase 1 and 2 were not significantly different.

7.5.3 Frequency of Use of Strategies

Table 27 sets out the frequencies that each of the 12 teachers reported using each of the five classroom management strategies. Inspection of this table shows that the most commonly used strategy was reinforcement, which was used 38 times over the one-week recording period and across the 12 teachers. These teachers also commonly used strategies indicative of organising the classroom and curriculum. Table 27 also indicates that the least used strategy was planned ignoring, which was closely followed by emotional support strategies.

Table 27
Frequency of Self-Reported Usage of Each Strategy Across the 12 Teachers

	Reinforcement	Negative consequences	Planned ignoring	Classroom/ curriculum	Emotional support	TOTAL
1	5	0	0	0	0	5
2	1	2	0	5	1	9
3	4	1	0	1	1	7
4	5	0	0	0	0	5
5	6	2	0	0	0	8
6	3	2	0	0	1	6
7	0	3	0	2	0	5
8	0	0	0	10	0	10
9	7	4	2	8	1	22
10	5	0	0	2	0	7
11	1	2	0	5	0	8
12	1	2	1	0	0	4
TOTAL	38	18	3	33	4	96

7.5.4 Teachers' Accuracy of Identifying Strategy Types

Each of the 96 examples of behaviour management strategies were then coded by the researcher to check teachers' accuracy at identifying the strategies they reportedly used. That is, if a teacher ticked the reinforcement box to indicate that the strategy they had described was an example of reinforcement, was it? Two lay people known to the writer also coded the examples given by teachers. The author explained each of the five behaviour management strategies to the two lay people, and also provided them with the recording sheets presented to teachers. Inter-rater reliability on both occasions was 100% with the codes given by the writer.

Inspection of these data showed that teachers were on the whole very accurate at identifying the types of strategies they used during the one-week period. In fact, of the 96 described behaviours, there was only one instance where a teacher incorrectly identified a strategy detailed as planned ignoring. The behaviour the teacher engaged in was "Sent the child to get his medication 10 minutes early". However, this is clearly not an accurate example of planned ignoring. Rather, this behaviour is more indicative of either reinforcement or negative consequences, depending on the antecedent and consequence of the behaviour, as well as the child's perception of being sent out of class early. For example, if the child was sent out early during a difficult mathematics task for being disruptive, it is likely that he

would perceive the behaviour of his teacher positively, and thus be more inclined to be disruptive in the future when he does not wish to engage in the class (positive reinforcement). On the other hand, if the child was sent out early during an enjoyable class activity for being disruptive, it is likely that he would perceive the behaviour of his teacher negatively, and thus be less inclined to be disruptive again in the future (negative consequences).

7.6 Summary and Suggestions

Overall, phase 1 showed that the most commonly used strategy by in-service teachers to manage the behaviour of a student with ADHD was reinforcement. Reinforcement was used significantly more frequently than either negative consequences, planned ignoring, and emotional support, and planned ignoring was the least commonly used strategy. Given that all of these strategies have been thoroughly validated in the literature when implemented correctly (Anhalt et al., 1998; DETE, 1999; DuPaul & Eckert, 1997; DuPaul & Power, 2000; Jarman, 1996; Pelham Jr. et al., 1998; Pfiffner et al., 1985), it is suggested that programs be developed to instruct teachers on the correct use of each of them. This is important because if the strategies are implemented incorrectly they may be rendered ineffective. Teachers should also be encouraged to use these strategies equally often in their classroom to manage students with ADHD.

With regard to the correlation analyses, teacher and parent norms were significantly correlated for each of the behaviour management strategies. This highlights the possibility of redundancy in the data for this sample of teachers, and suggests that these two measures of subjective norm might better be represented as a single variable as originally postulated by Ajzen and Fishbein (1980). Further, attitude toward reinforcement was significantly associated with teachers' perceptions of control regarding their use of reinforcement. Teachers' attitude toward negative consequences, planned ignoring, and organising the classroom and curriculum, were significantly correlated with teachers' intention to perform the respective strategy. Teachers' attitude toward organising the classroom and curriculum

was also significantly associated with parent norm and perceived control regarding this strategy type. Finally, none of the predictors were significantly associated with teachers' reported use of any of these strategies (i.e., behaviour). These findings have shown discrepancies across the five management strategies in terms of significant correlations between the predictors. However, given the small sample size used in phase 1 (study 2), caution must be taken when interpreting and generalising these findings to the wider teacher community.

Phase 2 data supported the findings of phase 1, showing that reinforcement was the most commonly used strategy in the classroom management of children with ADHD, and that planned ignoring was the least commonly used strategy. On average, teachers used reinforcement-type strategies once or twice a day. Finally, phase 2 showed that teachers are quite accurate at identifying the strategies they use to manage the behaviour of students with ADHD in their class. Teachers' accuracy at identifying strategies used showed that they have some knowledge regarding appropriate strategies to utilise in the classroom management of ADHD. However, teachers predominately used reinforcement and rarely used planned ignoring to manage students with ADHD, thus adding further support to develop an educative program for teachers regarding the use and benefit of each of the five classroom management strategies for students with ADHD.

CHAPTER 8: STUDY 3

A COMPARISON OF IN-SERVICE AND PRE-SERVICE PRIMARY SCHOOL TEACHERS' KNOWLEDGE AND ATTITUDES REGARDING ADHD

8.1 Overview

This chapter describes the methodology, results and discussion for Study 3, which involved an investigation of pre-service teachers' knowledge about, and attitudes toward ADHD, as well as a comparison between pre-service teachers and in-service teachers in regard to knowledge and attitudes toward ADHD. The in-service teacher sample used in this study was the same sample detailed in chapter 6. Therefore, data pertaining to in-service teachers, such as demographic information, knowledge scores and attitude ratings, will not be provided here.

8.2 Method

8.2.1 Participants

The pre-service sample consisted of 45 female university students who were completing their final year of an education degree (primary) at RMIT University, Bundoora, Australia. As part of their degree, all students are required to engage in practical placements in schools. Teachers' ages ranged from 20 to 43 years, with an average age of 23.6 years ($SD = 5.6$ years). One of the pre-service teachers failed to respond to the items regarding ADHD training and university education. Of the 44 pre-service teachers who answered these items, 32 (72.73%) indicated that their university education involved information about ADHD, and 21 (47.73%) pre-service respondents reported that they had engaged in skill development to manage children with ADHD as part of their university education. Finally, each of the 45 in-service teachers reported a desire to engage in additional ADHD training. Refer to chapter 6 for demographic information pertaining to the in-service sample.

8.2.2 Materials

The self-report questionnaire detailed in section 5.2 was used in this study. Questions assessing demographics were the same across the two sub-samples with two exceptions: in-

service teachers were asked to record the number of years they had been teaching, as well as the number of ADHD students they had taught during their career, but pre-service teachers were not asked these questions. Item 70 (*My school has policies that regulate how teachers manage a child with ADHD*), was also omitted from the pre-service teacher questionnaire as it was deemed irrelevant to this sample of teachers.

8.2.3 Procedure

After university ethics clearance was granted, the researcher approached the fourth year education co-ordinator at the university to ask permission to attend tutorials and ask pre-service teachers to participate in the study. The first author spoke briefly about the study at one of two tutorials, and two research assistants spoke at the second tutorial. Each of the pre-service teachers was given an envelope containing the questionnaire and a plain language statement detailing the study (see Appendix P). The research assistants returned at the conclusion of both tutorial classes to collect the questionnaires. Participation was both voluntary and anonymous for all respondents. See section 6.2.3 for details about the procedure used for in-service teachers.

8.3 Results

8.3.1 Response Rates

Of the 50 questionnaires distributed to pre-service teachers, 45 were returned, giving a response rate of 90.0%. For in-service teachers, the response rate was 74.5% (see section 6.2.3 for additional details).

8.3.2 Knowledge Regarding ADHD

For pre-service teachers, perceived knowledge scores ranged from 0 to 7.5 cm, with a mean of 2.94 cm ($SD = 2.0$) or 29.4%. In-service teachers' perceived knowledge was 47.7% (see 6.3.2 for details). On average, pre-service teachers were able to correctly answer 14.2 ($SD = 4.6$) of the 27 actual knowledge items, giving pre-service teachers an average actual

knowledge score of 52.6%. In-service teachers correctly answered 16.4 ($SD = 4.0$), or 60.7% of the 27 knowledge items.

Table 28 sets out the percentage (and number) of pre-service and in-service teachers who correctly answered each of the 27 ADHD knowledge items. Inspection of this table shows that item 24 “Children from any walk of life can have ADHD” was the most commonly correctly answered item for both pre- and in-service teachers. Furthermore, Table 28 shows that items 17, 19, and 20 were correctly answered commonly by the pre-service teacher sample, whereas, items 11, 17, and 25 were commonly correctly answered by in-service teachers.

Table 28

Percentage (and Number) of Pre- and In-Service Teachers Who Correctly Answered Each of the 27 Knowledge Items

Item No.	Item	Pre-service ($n = 45$)	In-service ($n = 120$)
1	There are a greater number of boys than girls with ADHD	75.6 ($n = 34$)	81.7 ($n = 98$)
2	There is approximately 1 child in every classroom with a diagnosis of ADHD	46.7 ($n = 21$)	45 ($n = 54$)
3	If medication is prescribed, educational interventions are often unnecessary	44.4 ($n = 20$)	75 ($n = 90$)
4	ADHD children are born with biological vulnerabilities towards inattention and poor self control	48.9 ($n = 22$)	48.3 ($n = 58$)
5	If a child responds to stimulant medication (e.g., Ritalin) then they probably have ADHD	37.8 ($n = 17$)	47.5 ($n = 57$)
6	A child who is not over-active, but fails to pay attention, may have ADHD	40 ($n = 18$)	60 ($n = 72$)
7	ADHD is often caused by food additives	51.1 ($n = 23$)	57.5 ($n = 69$)
8	ADHD can be diagnosed in the doctor's office most of the time	57.8 ($n = 26$)	69.2 ($n = 83$)
9	Children with ADHD always need a quiet environment to concentrate	44.4 ($n = 20$)	50.8 ($n = 61$)
10	Approximately 5% of Australian school-aged children have ADHD	35.6 ($n = 16$)	35.8 ($n = 43$)
11	ADHD children are usually from single parent families	80 ($n = 36$)	87.5 ($n = 105$)
12	Diets are usually not helpful in treating most children with ADHD	26.7 ($n = 12$)	14.2 ($n = 17$)

Table 28 cont.

13	ADHD can be inherited	16.6 (n = 7)	42.5 (n = 51)
14	Medication is a cure for ADHD	71.1 (n = 32)	84.2 (n = 101)
15	All children with ADHD are over-active	60 (n = 27)	77.5 (n = 93)
16	There are subtypes of ADHD	68.9 (n = 31)	75 (n = 90)
17	ADHD affects male children only	84.4 (n = 38)	95.8 (n = 115)
18	The cause of ADHD is unknown	51.1 (n = 23)	32.5 (n = 39)
19	ADHD is the result of poor parenting practices	91.1 (n = 41)	80 (n = 96)
20	If a child can play Nintendo for hours, than s/he probably doesn't have ADHD	82.2 (n = 37)	77.5 (n = 93)
21	Children with ADHD cannot sit still long enough to pay attention	48.9 (n = 22)	65.8 (n = 79)
22	ADHD is caused by too much sugar in the diet	71.1 (n = 32)	75 (n = 90)
23	Family dysfunction may increase the likelihood that a child will be diagnosed with ADHD	26.7 (n = 12)	35 (n = 42)
24	Children from any walk of life can have ADHD	95.6 (n = 43)	96.7 (n = 116)
25	Children with ADHD usually have good peer relations because of their outgoing nature	51.1 (n = 23)	88.3 (n = 106)
26	Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood	4.4 (n = 2)	21.7 (n = 26)
27	Children with ADHD generally display an inflexible adherence to specific routines and rituals	11.1 (n = 5)	22.5 (n = 27)

8.3.3 Analysis of Variance

A mixed factorial analysis of variance (ANOVA) was conducted to investigate the relationships between knowledge and type of teacher. The within-subjects factor, knowledge, had two levels; perceived knowledge (based on the teacher's mark on the visual analogue scale) and actual knowledge (based on the teacher's score on the 27-item knowledge questionnaire). The between-subjects factor, type of teacher; also had two levels; in-service teacher or pre-service teacher.

The analysis showed a significant interaction between knowledge and teacher-type, $\Lambda = .95$, $F(1, 163) = 9.36$, $p = .05$, $\eta^2 = .054$. There were main effects for both knowledge, $F(1, 163) = 114.28$, $p < .001$, and type of teacher, $F(1, 163) = 22.41$, $p < .001$. In-service teachers rated themselves significantly more highly on perceived knowledge about ADHD than did pre-service teachers, and in-service teachers scored significantly more highly on the actual knowledge questionnaire than did pre-service teachers. Analysis of simple main effects showed a significant difference in perceived and actual knowledge for both in-service teachers, $F(1, 163) = 53.37$, $p < .001$, and pre-service teachers, $F(1, 163) = 64.99$, $p < .001$. Inspection of means showed that actual knowledge was significantly higher than perceived knowledge for both groups of teachers.

8.3.4 Actual ADHD Knowledge: Incorrect and Don't Know Responses

The incorrect and don't know responses selected by pre-service and in-service teachers were then calculated and tabulated. These data are shown in Table 29. This table shows that pre-service teachers' most common incorrect response was for item 27, whereas, in-service teachers tended to incorrectly answer item 12 most often. Other incorrectly answered items for pre-service teachers were items 6, 12, and 23, and for the in-service sample were 2, 23, and 27 (see Table 29). With regard to don't know responses, Table 29 indicates that the majority of pre-service and in-service teachers selected the *don't know* response for item 26. In addition, pre-service teachers commonly answered *don't know* for items 5, 10, and 13. Whereas, in-service teachers commonly selected *don't know* for items 10, 12, and 18. Importantly, rather than often incorrectly answering the items, both groups of teachers tended to select the *don't know* response more readily (see Table 29).

Table 29

Percentage (and Number) of Pre- and In-Service Teachers Who Selected an Incorrect or Don't Know Response for Each of the 27 Knowledge Items

	Item	Percent Incorrect		Percent Don't know	
		Pre-service	In-service	Pre-service	In-service
1	There are a greater number of boys than girls with ADHD	2.2 (n = 1)	5.8 (n = 7)	22.2 (n = 10)	12.5 (n = 15)
2	There is approximately 1 child in every classroom with a diagnosis of ADHD	4.4 (n = 2)	26.7 (n = 32)	48.9 (n = 22)	28.3 (n = 34)
3	If medication is prescribed, educational interventions are often unnecessary	22.2 (n = 10)	9.2 (n = 11)	33.3 (n = 15)	15.8 (n = 19)
4	ADHD children are born with biological vulnerabilities towards inattention and poor self control	11.1 (n = 5)	16.7 (n = 20)	40 (n = 18)	35 (n = 42)
5	If a child responds to stimulant medication (e.g., Ritalin) then they probably have ADHD	11.1 (n = 5)	20 (n = 24)	51.1 (n = 23)	32.5 (n = 39)
6	A child who is not over-active, but fails to pay attention, may have ADHD	28.9 (n = 13)	20 (n = 24)	31.1 (n = 14)	20 (n = 24)
7	ADHD is often caused by food additives	13.3 (n = 6)	20 (n = 24)	35.6 (n = 16)	22.5 (n = 27)
8	ADHD can be diagnosed in the doctor's office most of the time	20 (n = 9)	12.5 (n = 15)	22.2 (n = 10)	18.3 (n = 22)
9	Children with ADHD always need a quiet environment to concentrate	20 (n = 9)	20.8 (n = 25)	35.6 (n = 16)	28.8 (n = 34)
10	Approximately 5% of Australian school-aged children have ADHD	8.9 (n = 4)	9.2 (n = 11)	55.6 (n = 25)	55 (n = 66)
11	ADHD children are usually from single parent families	4.4 (n = 2)	3.3 (n = 4)	15.6 (n = 7)	9.2 (n = 11)
12	Diets are usually not helpful in treating most children with ADHD	28.9 (n = 13)	45.8 (n = 55)	44.4 (n = 20)	40 (n = 48)
13	ADHD can be inherited	20 (n = 9)	24.2 (n = 29)	64.4 (n = 29)	33.3 (n = 40)
14	Medication is a cure for ADHD	13.3 (n = 6)	5 (n = 6)	15.6 (n = 7)	10.8 (n = 13)
15	All children with ADHD are over-active	22.2 (n = 10)	11.7 (n = 14)	17.8 (n = 8)	10.8 (n = 13)
16	There are subtypes of ADHD	0	1.7 (n = 2)	31.1 (n = 14)	23.3 (n = 28)
17	ADHD affects male children only	0	0.8 (n = 1)	15.6 (n = 7)	3.3 (n = 4)
18	The cause of ADHD is unknown	11.1 (n = 5)	14.2 (n = 17)	37.8 (n = 17)	53.3 (n = 64)
19	ADHD is the result of poor parenting practices	0	6.7 (n = 8)	8.9 (n = 4)	13.3 (n = 16)
20	If a child can play Nintendo for hours, than s/he probably doesn't have ADHD	2.2 (n = 1)	2.5 (n = 3)	15.6 (n = 7)	20 (n = 24)
21	Children with ADHD cannot sit still long enough to pay attention	31.1 (n = 14)	21.7 (n = 26)	20 (n = 9)	12.5 (n = 15)
22	ADHD is caused by too much sugar in the diet	4.4 (n = 2)	5 (n = 6)	24.4 (n = 11)	20 (n = 24)

Table 29 cont.

23	Family dysfunction may increase the likelihood that a child will be diagnosed with ADHD	31.1 (n = 14)	42.5 (n = 51)	42.2 (n = 19)	22.5 (n = 27)
24	Children from any walk of life can have ADHD	0	0.8 (n = 1)	4.4 (n = 2)	2.5 (n = 3)
25	Children with ADHD usually have good peer relations because of their outgoing nature	4.4 (n = 2)	4.2 (n = 5)	44.4 (n = 20)	7.5 (n = 9)
26	Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood	20 (n = 9)	4.2 (n = 5)	75.6 (n = 34)	74.2 (n = 89)
27	Children with ADHD generally display an inflexible adherence to specific routines and rituals	55.6 (n = 25)	35.8 (n = 43)	33.3 (n = 15)	41.7 (n = 50)

8.3.5 Pre-Service Teachers' Attitude Data: Individual Attitude Items

There was substantial missing data for pre-service teachers on 7 of the 31 items used to assess attitudes toward ADHD (see section 6.3.5), presumably because these items were not relevant to the pre-service sample. For example, only four teachers gave a response to the item, *Other staff influence how I would manage a child with ADHD*. Given this problem with missing data, only 24 attitude items were assessed for the pre-service sample of teachers.

Table 30 sets out these findings. As with the in-service data, item means are presented from lowest to highest in the table. A low mean score (i.e., a score closer to 0) indicates that teachers agreed with that item, whereas a high mean score (i.e., a score closer to 10) indicates that participants tended to disagree with the item. A mean score around five indicates that teachers did not have strong beliefs for or against the statement.

Inspection of Table 30 shows that item 1 was the most strongly agreed with item, showing that pre-service teachers tended to perceive ADHD as a valid diagnosis. Similarly, items 7 and 6 were strongly agreed with by this group of teachers, indicating a belief that ADHD is a legitimate educational problem, which should only be treated with medication as a last resort.

Further, Table 30 shows that items 2 and 19 were the most strongly disagreed with items, showing that pre-service teachers neither believe that ADHD is an excuse for children to misbehave, nor that children with ADHD misbehave because they are naughty. Moreover, these teachers tended to disagree with items 14 and 17, showing that pre-teachers believe that

children with ADHD should be taught in the regular school system and that one can expect as much from a student with ADHD as one can from other children. Finally, pre-service teachers did not hold strong positive or negative beliefs toward items 12 and 24 (see Table 30).

Table 30
Descriptive Statistics for Pre-Service Teachers' Responses to the 24 Attitude Items

	Item	Mean	SD
1	ADHD is a valid diagnosis	2.26	2.09
7	ADHD is a legitimate educational problem	2.66	2.77
6	Medications such as Ritalin and Dexamphetamine should only be used as a last resort	3.20	2.37
3	ADHD is diagnosed too often	3.67	2.39
22	ADHD children have little control over the way they behave	3.71	2.32
12	I would prefer to teach a student who was over-active than one who was inattentive	4.99	2.58
24	Students with ADHD are just as difficult to manage in the classroom as any student	5.00	2.72
8	Having an ADHD child in my class would disrupt my teaching	5.20	2.67
15	The extra time teachers spend with ADHD students is at the expense of students without ADHD	5.50	2.49
20	ADHD children cannot change the way they behave	5.58	2.62
4	ADHD is a behavioural disorder that should not be treated with medication	5.67	2.35
9	I would feel frustrated having to teach an ADHD child	5.78	2.39
13	Most students with ADHD don't really disrupt classes that much	5.87	2.28
16	Other students don't learn as well as they should when there is an ADHD child in the class	6.42	2.18
11	ADHD children should be taught by special education teachers	6.55	1.89
5	All children with ADHD should take medication	6.81	2.38
10	Young ADHD children should be treated more leniently than older ADHD children	7.40	1.90
21	ADHD students could do better if only they'd try harder	7.42	2.09
18	Children with ADHD could control their behaviour if they really wanted to	7.44	1.96
23	ADHD children misbehave because they don't like following rules	7.74	1.95
14	Children with ADHD should not be taught in the regular school system	7.86	2.50
17	You cannot expect as much from an ADHD child as you can from other children	7.91	1.58
2	ADHD is an excuse for children to misbehave	8.02	2.43
19	ADHD children misbehave because they are naughty	8.67	1.31

8.3.6 Comparison of Pre-Service and In-Service Teachers' Attitudes Toward ADHD

Both pre-service and in-service teachers tended to strongly agree with item 1 ($M_{PS} = 2.26, M_{IS} = 2.89$) and item 7 ($M_{PS} = 2.67, M_{IS} = 2.40$), indicating that both groups of teachers saw ADHD as a valid diagnosis and legitimate educational problem. On the contrary, both

groups of teachers tended to strongly disagree with items 2 ($M_{PS} = 8.02, M_{IS} = 7.14$), 19 ($M_{PS} = 8.67, M_{IS} = 7.70$), and 14 ($M_{PS} = 7.87, M_{IS} = 7.78$), showing a strong belief that ADHD is not merely an excuse for children to misbehave and that these children should be taught in the regular school system.

Furthermore, while pre-service and in-service teachers held similar attitudes across most items (i.e., most mean scores are very close across the two samples), there were some major differences across the two samples of teachers. Therefore, a series of independent *t*-tests were carried out to assess which items were answered significantly differently across the two sub-samples of teachers. As suggested by Salkind (2003), an adjusted alpha level of .01 was used to assess the 24 *t*-tests conducted. Of these analyses, four were statistically significant and these results are presented in Table 31.

This table shows that in-service teachers' strongly agreed significantly more so with each of the four items, than did pre-service teachers. First, on average in-service teachers believed significantly more strongly than pre-service teachers that the extra time teachers spend with ADHD students is at the expense of students without ADHD, $t(163) = 3.86, p < .001$. Second, in-service teachers agreed significantly more strongly than pre-service teachers that other students don't learn as well as they should when there is an ADHD child in the class, $t(163) = 2.39, p = .01$. Third, in-service teachers believed more strongly that one should not expect as much from children with ADHD as one might from typically developing children, than did the pre-service sample, $t(163) = 2.82, p = .005$. Finally, the in-service sample agreed more strongly than did pre-service teachers that ADHD children misbehave because they are naughty, $t(163) = 2.93, p = .004$.

Table 31

*Attitude Items Which Pre-Service and In-Service Teachers Answered Significantly Different**

Item	Mean	
	Pre	In
15 The extra time teachers spend with ADHD students is at the expense of students without ADHD	5.50	3.86
16 Other students don't learn as well as they should when there is an ADHD child in the class	6.42	5.31
17 You cannot expect as much from an ADHD child as you can from other children	7.91	6.73
19 ADHD children misbehave because they are naughty	8.67	7.70

* $p < .01$

8.4 Summary and Suggestions

In-service teachers scored significantly more highly than pre-service teachers on the actual ADHD knowledge questionnaire. Furthermore, the mixed factorial ANOVA showed a significant relationship between perceived and actual knowledge, however, this relationship was in the opposite direction than predicted. That is, actual knowledge was significantly greater than perceived knowledge for all respondents. This finding is accord with that reported for in-service teachers alone and the impact these findings have on the optimistic bias literature have been previously noted (see section 6.4).

Pre-service and in-service teachers generally held comparable views regarding beliefs about ADHD. Specifically, both pre-service and in-service teachers held strong beliefs about the legitimacy of ADHD, both in terms of the disorder itself and as an educational problem. Moreover, both groups of teachers indicated that ADHD is not merely an excuse for children to misbehave and that children with the condition ought to be educated in the mainstream system.

There were however, some items for which the two samples of teachers held significantly different attitudes. Contrary to pre-service teachers, in-service teachers believed more strongly that students with ADHD have a negative impact on other students and that one should not expect as much from children with ADHD as one might from typically developing children. Pre-service teachers on the other hand tended to disagree significantly more strongly than did in-service teachers that children with ADHD misbehave because they are naughty.

Although the necessity of developing educative training programs for teachers has been repeatedly shown thus far, the findings above regarding pre-service and in-service teachers' attitudes illustrate that teachers do not require information about the legitimacy of ADHD or the importance of maintaining these children in mainstream schooling. Further, the differences in attitude across the two samples of teachers shows that in-service teachers believe more strongly than do pre-service teachers that students with ADHD have a negative impact on others and that one should not expect as much from children with ADHD as one might from typically developing children. In-service teachers' tendency to hold more negative beliefs about ADHD children than do pre-service teachers may be a reflection of reality, whereby pre-service teachers hold more optimistic beliefs about these children because they have yet to experience the negative classroom effects associated with ADHD students. It might be however that pre-service teachers are excited about their new career and are therefore overly optimistic about many facets of the classroom environment, and conversely, that in-service teachers, having spent considerable time in their career, are tired and subsequently pessimistic about children. These are only hypothetical suggestions, and further research is required to accurately ascertain the reasons behind the attitudinal differences of pre-service and in-service teachers.

CHAPTER 9: STUDY 4

ADHD WORKSHOP FOR PRIMARY SCHOOL TEACHERS

9.1 Overview

This chapter provides details about the ADHD workshop that was developed in response to the findings of studies 1 and 2 (see sections 6.3 and 7.4, respectively). The rationale and methodology used is detailed in this chapter, and the findings from pre-test, post-test, and three-month follow-up are provided.

9.2 Rationale

The workshop was not developed until the data from studies 1 and 2 had been collected and analysed. This conforms with Fishbein and Middlestadt's (1987) recommendation regarding the development of educational interventions, and also enabled the author to tailor the intervention to teachers' needs. Study 1 showed that teachers overwhelmingly felt they needed additional training in ADHD and that a workshop would be the best way to receive this training. It was also shown in Study 1 that teachers' ADHD knowledge had much room for improvement, and that teachers held some negative attitudes toward ADHD. One of the aims of the workshop was to dissipate these negative attitudes. According to past research, negative attitudes are favourably influenced by increasing knowledge via a lecture type programme (Li; 1985 Towner, 1984), and the most effective means of altering another's attitude is to provide that person with new information (e.g., Fishbein & Ajzen, 1975).

Whilst Study 2 provided valuable information about the types of strategies teachers use in the classroom management of ADHD-related behaviours, it was not entirely clear if teachers were using these strategies correctly. Therefore, the workshop enabled the author to instruct teachers in the correct use of behavioural management strategies, which is in accord with Reid (1999), who reported that teachers may require specific training in behavioural management techniques. This was particularly important because incorrect use of a strategy can render it ineffective.

Overall, the aim of the ADHD workshop was to increase teachers' ADHD knowledge, and dissipate misperceptions about the disorder, both immediately (post-test) and in the longer-term (follow-up). The aim was also to provide teachers with information about empirically validated psychological interventions for the classroom management of students with ADHD, and to provide them with the opportunity to practice the use of those strategies. The strategies covered (positive reinforcement, punishment, planned ignoring, organising the classroom and emotional support) in the workshop were among those suggested by DETE (1999) and have all been thoroughly validated in the literature.

9.3 Method

9.3.1 Participants

Nine primary school teachers (8 female) attended the ADHD workshop. Seven taught in government (State) primary schools and two taught in Catholic primary schools. The ages of teachers ranged from 23 to 49, with an average age of 36.2 years ($SD = 9.7$ years). The average age of workshop participants was somewhat similar to that reported in Study 1 for the sample of 120 teachers (39.2 years).

9.3.2 Materials

A pamphlet providing details of the workshop was developed to advertise the event. This pamphlet provided details about the date, time, venue, and content of the workshop, as well as a cute cartoon to catch teachers' attention (see Appendix Q). A video recorder was also used to tape the instructor's performance during the workshop.

Two manuals were developed for the ADHD workshop. The first was the trainer's manual, which provided a step-by-step guide to run the workshop. Overhead transparencies were also included in this manual as well as copies of the pre-test, post-test and three-month follow-up assessments (detailed in 5.9.1, 5.9.2, and 5.9.3, respectively) given to teachers. The trainer's manual is presented in Appendix R. The second manual was designed for workshop attendees and was therefore called the teacher's manual. This manual also included a copy of

each of the overhead transparencies presented during the workshop, with room for teachers to write notes on beside each overhead (see Appendix S). Note that one of the activities developed to use in the workshop was not conducted because of time constraints on the night. This activity was the role-play, and the item developed to assess it during the post-workshop assessment was removed from the analyses reported in section 9.3.5 because it was deemed irrelevant to evaluate. Finally, pre-test, post-test and three-month follow-up assessments were given to all workshop participants. The trainer's manual provided in Appendix R provides a copy of each of these assessments.

Pre-Test Assessment. Teachers were asked to complete a three-page questionnaire. The first two pages were identical to Sections A and B of the ADHD questionnaire used for in-service teachers (see sections 5.2.1 and 5.2.2, respectively). The third page was a reduced version of the attitude items (Section C) assessed in the original questionnaire. Of the 31 attitude items used in Study 1 (see section 6.3.5), 14 were randomly selected to use in the workshop assessments. A subset of the original attitude item set was used because of time constraints. That is, it was anticipated that teachers would complete the pre-test assessment during the first 15 minutes of the workshop, and this would have been highly unlikely if teachers were requested to complete the full set of attitude items.

Post-Test Assessment. The post-test assessment included a four-page questionnaire. The first page assessed teachers' demographic details. The second page investigated teachers' beliefs about the usefulness of, and satisfaction with, the workshop. There were 12 items presented to teachers; 8 of which were on visual analogue scales and the remaining 4 asked for qualitative responses. The final two pages again assessed teachers' ADHD knowledge and attitudes, respectively.

Three-Month Follow-Up Assessment. This four-page assessment collected teachers' demographic data, ADHD knowledge and attitudes in the same manner as collected in the pre- and post-tests measures. Teachers were also asked to complete a set of 10 items to assess

the utility of the workshop; 6 of which asked teachers to respond on a visual analogue scale and 4 required teachers to write responses. Finally, teachers were asked to complete a behaviour management record for a one-week period to indicate the strategies used to manage classroom behaviour problems. Finally, coding procedures for all workshop assessments were identical to those used in the original studies.

9.3.3 Procedure

After relevant ethics applications were sought and granted (see Appendix T for ethics approval letters), principals from each of the 16 primary schools who participated in study 1 (see section 6.2.1) were contacted to ask if teachers would like to attend a free ADHD workshop. The researcher sent each principal a letter requesting permission for teachers to attend the workshop (see Appendix U), along with pamphlets advertising it. There was a poor response by teachers regarding interest in attending the workshop, with only two teachers indicating a desire to attend.

As a result of this poor response, the author contacted five primary school teachers known to her professionally to ask advice on appropriate dates and times to re-advertise the workshop. Following these discussions it was decided that a shorter workshop be run on a weeknight after school hours. Pamphlets were changed to reflect the new workshop details, which were then redistributed to each of the 16 schools. Teachers were also informed that they could invite colleagues from other schools as well. Following this invitation, 12 teachers indicated their interest in attending the workshop.

The workshop was run at a local community centre on Thursday 1st August 2002 between the hours of 4:15pm and 7:15pm. Teachers were provided with refreshments both before and during the workshop. Teachers were given a plain language statement to read at the commencement of the workshop (see Appendix V), along with the pre-test assessment. Demographic details were collected at pre-test. Measures of perceived knowledge, actual knowledge and attitudes toward ADHD were collected immediately prior to the

commencement of the workshop (pre-test), immediately following the workshop (post-test), and then three-months after the workshop (follow-up). As in previous analyses, all analyses on knowledge data were assessed via percentage scores. There was also a measure of satisfaction given to teachers post-test and at follow-up to evaluate teachers' perceptions about the workshop (see section 9.2 for details). Finally, the entire workshop was video recorded to enable the instructor to assess the extent to which the workshop manual was followed.

9.4 Results

9.4.1 Demographic Information

Of the nine teachers who attended the workshop, three held a Bachelor of Arts/Teaching Degree, one held a Bachelor of Arts (Education) Degree, and five held a Bachelor of Education Degree, with two of these teachers also having Integration aide certificates. The duration of attendees' teaching experience ranged from 1 to 12 years, with a mean of 4.9 years ($SD = 4.8$ years). This was somewhat lower than that reported in the sample of 120 teachers from Study 1, whose average teaching experience was 15.2 years.

At the time the workshop was run, four teachers were teaching junior grade levels (prep, 1, or 2), one was teaching middle school grades (3 or 4), one was teaching senior grades (grades 5 or 6), and three were teaching across multi-grade levels.

Five of the nine attendees indicated that their university education involved information about ADHD, and three said that they had engaged in skill development to manage children with ADHD as part of their university education. Three teachers reported having engaged in additional ADHD training after obtaining their university qualification.

Six teachers had previously taught a child with ADHD, and three were currently teaching a student with the disorder. The number of ADHD students taught across these teachers ranged from 0 to 6, with an average of 3 ($SD = 2.4$) students over a teacher's career. Most (6/9) teachers reported having or having had children in their class they believed should

be diagnosed with ADHD, but were not. Two of the nine teachers indicated that their school employed people specifically to help children with ADHD.

9.4.2 Knowledge about ADHD

Perceived knowledge and actual knowledge were measured at pre-test, post-test, and three-month follow-up. Table 32 provides the mean (and standard deviation) perceived knowledge ratings and actual knowledge scores across the three measurement times. The table shows that perceived knowledge ratings increased from pre-test to post-test, and again at follow-up. Further, actual knowledge scores increased from pre-test to post-test, but decreased slightly by the three-month follow-up. Finally, variability across individual teachers' knowledge scores decreased across the three testing periods (see Table 32).

At pre-test, teachers' perceived knowledge ratings ranged from 1.5 to 6.5cm, with an average score of 38.3% across the sample of teachers. This appears significantly lower than the average perceived knowledge rating of 47.7% found for teachers in Study 1. At post-test, perceived knowledge ranged from 4.5 to 10cm, with an average rating of 69.4%, and at three-month follow-up perceived knowledge ranged from 2 to 10cm ($M = 70.6\%$). Teachers' actual knowledge of ADHD scores ranged from 13 to 23 (out of 27) at pre-test, with an average knowledge score of 66.3% at pre-test. This score is slightly higher than that recorded for teachers in Study 1 (60.7%). At post-test, teachers' actual knowledge ranged from 18 to 25, with the average score of 81.5%, and by follow-up scores ranged from 19 to 24 ($M = 78.6\%$).

Table 32
Perceived and actual knowledge scores across the three measurement times

Measurement time	Perceived knowledge		Actual knowledge	
	Mean (%)	<i>SD</i>	Mean (%)	<i>SD</i>
Pre-test	3.83 (38.30)	1.87	17.89 (66.26)	3.22
Post-test	6.94 (69.40)	1.69	22.00 (81.48)	2.65
3-month follow-up	7.06 (70.60)	2.13	21.22 (78.59)	1.48

9.4.3 Within-Subjects ANOVA: Knowledge

To assess whether the differences in perceived and actual knowledge across the three testing times were statistically significant, a 3 (measurement time) x 2 (knowledge type) within-subjects analysis of variance (ANOVA) was conducted. The multivariate approach showed that there was no significant interaction between measurement time and knowledge type. However, there were strong and significant main effects for both time, $F(1, 8) = 23.36$, $p = .001$, and knowledge $F(1, 8) = 22.13$, $p = .002$. Pairwise comparisons (with Bonferroni adjusted significance levels) of the estimated marginal means for the three levels of time showed a significant difference between pre-test and post-test knowledge ($p = .01$) and between pre-test and three-month follow-up knowledge ($p = .002$), but no significant difference between post-test and follow-up knowledge. Inspection of the marginal means for the two statistically significant findings showed that pre-test knowledge was significantly lower than post-test and three-month follow-up knowledge, respectively.

9.4.4 Attitudes Regarding ADHD

These results pertain to teachers' responses to the 14 attitude items assessed at pre-test, post-test, and follow-up. Descriptive statistics were calculated for each of these items, and appear in Table 33. A low mean score (i.e., a score closer to 0) indicates that participants tended to agree with the particular item, whereas, a high mean score (i.e., a score closer to 10) indicates that on average participants disagreed with that item. A mean score around five indicates that teachers did not have a strong belief for or against the particular item. Items appear in the table in the order they were presented to teachers.

Table 33 shows that item 1 was the most strongly agreed with item at each of three testing periods, indicating that teachers believed that ADHD is a legitimate educational problem before, after, and three-months following the workshop. Further, at pre-test, teachers strongly believed that their teaching would be disrupted if they had a student with ADHD in their class (item 4), however, the strength of this belief declined by post-test and again at

follow-up (see Table 33). Further inspection of Table 33 shows teachers' attitude toward item 5 differed somewhat across pre-test and post-test and again between post-test and follow-up. More specifically, at post-test teachers reported a strong belief that ADHD is diagnosed too often, and a neutral belief toward this item at both pre-test and follow-up. Teachers' attitude toward item 11 also shifted across the testing periods; at pre- and post-test, teachers held a fairly neutral attitude toward the item, but tended to disagree with the item at follow-up.

Table 33
Descriptive Statistics for Each of the 14 Attitude Items

	Item	Pre-test		Post-test		Follow-up	
		Mean	SD	Mean	SD	Mean	SD
1	ADHD is a legitimate educational problem	1.06	1.13	0.83	1.00	0.83	0.54
2	ADHD children should be taught by special education teachers	6.33	2.85	6.22	3.29	5.58	2.74
3	ADHD children misbehave because they are naughty	8.61	1.05	8.83	1.25	8.67	1.11
4	Having an ADHD child in my class would disrupt my teaching	3.78	1.84	5.06	2.04	5.17	2.07
5	ADHD is diagnosed too often	5.00	3.29	2.06	1.45	4.58	2.23
6	All children with ADHD should take medication	5.06	3.47	7.00	3.23	7.17	2.48
7	I would feel frustrated having to teach an ADHD child	5.83	1.58	6.11	2.55	6.17	1.83
8	Most students with ADHD don't really disrupt classes that much	7.11	1.68	5.11	1.56	6.91	1.10
9	Medications such as Ritalin and Dexamphetamine should only be used as a last resort	4.50	2.14	4.39	3.78	5.67	2.58
10	My school has policies that regulate how teachers manage a child with ADHD	8.17	2.89	7.17	3.17	7.67	2.61
11	Students with ADHD are just as difficult to manage in the classroom as any student	4.44	3.48	4.33	2.90	6.42	2.10
12	You cannot expect as much from an ADHD child as you can from other children	6.00	1.90	6.67	2.46	6.83	2.33
13	Children with ADHD could control their behaviour if they really wanted to	8.00	2.01	7.06	3.12	6.33	2.59
14	The extra time teachers spend with ADHD students is at the expense of students without ADHD	4.57	1.00	4.56	2.81	4.33	2.47

There was consistency across the three measurement times in terms of the most disagreed with item. This item, 3, showed that teachers believed that children with ADHD do not misbehave because they are naughty. Further, item 10 was strongly disagreed with by teachers, indicating a lack of school policies regarding the management of students with ADHD (see Table 33). There was also a general consensus across time that children with ADHD cannot change simply control their behaviour by choosing to do so, however the

strength of this belief decreased gradually from pre-test to post-test, and again from post-test to follow-up (see Table 33, item 13).

9.4.5 Within-Subjects ANOVA: Attitude

A series of 14 repeated measures ANOVA's were conducted to assess whether teachers' attitudes toward any of the 14 individual attitude items differed significantly over the three testing periods. Due to multiple analyses being performed, alpha was set at .01. Of the 14 analyses conducted, only item 8 was found to differ significantly across the testing periods, Wilks' $\Lambda = .27$, $F(2, 7) = 9.62$, $p = .010$.

9.4.6 Video Evaluation

To investigate whether the trainer's manual was followed by the instructor, the researcher and a layperson known to her watched the video recording of the workshop, individually, and marked each topic off as it was covered during the video. This procedure showed that except for one change, the instructor followed the manual precisely. This one difference was the exclusion of the role-play activity set out in the manual, which was removed purposefully by the instructor due to time constraints.

9.4.7 Workshop Evaluation: Quantitative Responses

Teachers were asked to complete a number of items at both post-test and three-month follow-up to assess their satisfaction with the workshop. Both quantitative and qualitative items were used. The quantitative items used to evaluate the workshop are presented in Tables 34 and 35. Table 34 provides the descriptive statistics for items used in the post-test assessment to assess teachers' satisfaction with the workshop, and Table 35 provides the data from the follow-up phase. For both tables, a lower mean score (i.e., closer to 0) indicates strong agreement with the item, whereas a higher mean score (i.e., close to 10) indicates a general disagreement with the item.

At post-test, teachers evaluated the workshop quite positively. Mean scores for the seven items assessed indicated that teachers were satisfied with the content, time and location

of the workshop (see Table 34). Table 34 also shows that teachers were highly satisfied with the presentation of the material and expressed an increased knowledge of ADHD and self-confidence in teaching students with the disorder (see Table 34).

Table 35 indicates that three-months after the workshop, teachers reported the usefulness of the strategies covered in the workshop, particularly in regard to improving student behaviour. Further, teachers reported that they had found time to implement the strategies covered and that they had not been too difficult to use. Finally, Table 35 shows that teachers intend to keep using the strategies detailed in the workshop in the future (see Table 35).

Table 34
Mean (and Standard Deviation) Satisfaction Ratings at Post-Test

Item	Mean	SD
1 The workshop content met my expectations	1.44	1.40
2 The information was clearly presented	0.78	0.75
3 Attending this workshop was valuable	0.72	0.91
4 The workshop was held at a convenient time	1.28	1.64
5 I learnt very little from attending the workshop	9.33	0.79
6 The workshop was held at a convenient place	0.61	0.82
7 This workshop has increased my confidence to teach students with ADHD	1.11	1.34

Table 35
Mean (and Standard Deviation) Satisfaction Ratings at Three-Month Follow-Up

Item	Mean	SD
1 The strategies I learned about have been very useful to me in my classroom	1.30	1.20
2 Students' behaviour has improved as a result of my use of these strategies	3.00	0.79
3 These strategies are too difficult to implement in the classroom	7.30	2.11
4 These strategies are not helpful as a means of improving students' behaviour	7.60	3.29
5 I have not had the time to try any of the strategies covered in the workshop	7.20	3.72
6 I intend to keep using these strategies in the future	0.70	0.84

9.4.8 Workshop Evaluation: Qualitative Responses

Teachers were also asked a number of questions to illicit qualitative data. Four separate items were used in both the post-test and follow-up assessments. The four items asked of teachers during the post-test assessment are shown in Table 36, along with verbatim

responses for each item. The responses in Table 36 show an overall satisfaction with attendance at the workshop, particularly with regard to the organisation and presentation of the training session. There were some suggestions made regarding changes to the workshop, including increasing the time spent on practical strategies and decreasing time spent discussing medication.

Table 36
Qualitative Workshop Evaluation Items and Verbatim Responses Collected at Post-Test

Items and Responses	
1	Were there any topics not covered that you would have liked to see included? School approach or policy toward students with ADHD – are there any guidelines or recommendations
2	What was the best aspect of this workshop? The booklet was put together well and was easy to read. The presenter as very informative and spoke clearly Presentation Clear information easily answered questions Very well presented → accurate information. Opportunity to question/discuss Group interaction, discussion, case studies No – it was well presented It reinforced a lot of my prior knowledge and encouraged me to continue to use a positive approach in the classroom. Well presented Informative The discussion of other treatments available
3	Would you change any aspect of this workshop? More time spent on the practical strategies I would like to spend more time Reduce the time talking about drugs
4	Are there any other comments that you would like to make about this workshop? Provided me with a better understanding of what ADHD means and what families and affected students must live with and confront → I'm sure greater knowledge affects teacher attitude and approach towards students with special needs → strategies used will be "appropriate". Very well organised & presented. Thankyou! It was excellent info Excellent. Well run & presented. I would encourage all teachers "particularly secondary level to attend"

Table 37 provides the four items used in the follow-up assessment as well as teachers' verbatim responses to each item. This table does not indicate teachers' preference or reported use of any strategy in particular, but rather that teachers reported using many of the strategies detailed in the workshop. Finally, teachers reported an intention to continue using many of these strategies in the future.

Table 37

Qualitative Workshop Evaluation Items and Verbatim Responses Collected at Follow-Up

Items and Responses	
1	Which strategies have you used in your classroom over the past 3 months to manage the behaviour of a student? Ignoring students, working with students one to one, sending them out of the attention Classroom organisation, Positive consequences, Negative consequences, Token economy, Planned ignoring Planned ignoring, +ve reinforcement, timeout Working closely with them & if it becomes too difficult, sending them out Revising boundaries constantly & consistently; seating arrangements, positive reinforcement; adjusting work, shorter activities, celebrating success; ignoring; consequences for negative behaviour
2	Which strategy have you used most often? Working closely with them & if it becomes too difficult, sending them out Positive consequences Timeout Revising boundaries; being clear about work expectations; short activities
3	Which strategy has been the most helpful? Positive consequences Timeout
4	Which strategy/s do you intend to use in the future? I'm trying to remember all of them! All of the above [Classroom organisation, Positive consequences, Negative consequences, Token economy, Planned ignoring] Variety of strategies depending on student

9.5 Summary

Overall, this chapter provided the details about an ADHD workshop that was implemented to increase the ADHD knowledge of primary school teachers, dissipate negative perceptions about the disorder, and provide teachers with information about the usefulness of five empirically validated classroom management strategies to use for students with ADHD. Nine primary school teachers attended the evening workshop. Results showed that whilst both perceived and actual knowledge significantly increased across pre-test and post-test, and across pre-test and follow-up, there was no change between post-test and follow-up.

Attitudes regarding ADHD remained relatively constant across the three testing periods, albeit there were some slight variations, which provided interesting findings. For example, pre-test and follow-up teachers neither agreed nor disagreed with the statement “ADHD is diagnosed too often”, however, at post-test teachers reported a strong belief that ADHD is over-diagnosed. Further, whilst teachers had neutral beliefs about students with

ADHD being just as difficult to manage in the classroom as any student, at both pre-test and post-test, they tended to strongly agree with this item at follow-up. Finally, item 8 (Most students with ADHD don't really disrupt classes that much) was shown to be the only attitude item to differ statistically significantly across the three testing periods.

It was also shown that teachers overwhelmingly perceived the workshop in a positive light both at post-test and follow-up. Teachers reported being satisfied with the content, time and location of the workshop, and were highly satisfied with the presentation of the material. Teachers also expressed an increased knowledge of ADHD and self-confidence in teaching students with the disorder. Finally, teachers reported using a number of the strategies covered in the workshop three months after their attendance, and stated that they intended to continue using them in the future.

CHAPTER 10: OVERALL DISCUSSION AND CONCLUSIONS

10.1 Overview

This final chapter provides an overall discussion of the results of each of the four studies conducted in this thesis. The results of each of the studies are summarised in turn, and the relationships between these findings and those of past research are then discussed. Methodological and theoretical limitations are covered, as are suggestions for future research in the area of ADHD and the education system. Implications of the findings to theory and the educational arena are then suggested, and conclusions are given regarding primary schools teachers' knowledge, attitudes, and behaviour toward children with ADHD.

10.2 Study 1: In-Service Teachers' Knowledge and Attitudes

Study 1 aimed to assess Australian teachers' knowledge of, and attitudes toward, ADHD, and the relationships between various teacher characteristics and teachers' knowledge about the disorder. The results did not support the first hypothesis that on average teachers would score about 50% on the knowledge questionnaire. On average, teachers correctly answered 60.7% of the 27 knowledge items. The second hypothesis, that higher scores on the ADHD knowledge questionnaire would be significantly associated with years of teaching experience, was not supported. Although participants with longer teaching careers perceived themselves as knowing more about ADHD than did their less experienced counterparts, ADHD knowledge was found to be similar across experienced and less-experienced teachers. There was evidence however to show that ADHD knowledge was significantly greater when teachers had had experience with teaching children with ADHD. Thus the third hypothesis that higher scores on the ADHD questionnaire would be significantly associated with experience in teaching students with ADHD was supported. The final hypothesis that perceived knowledge would be significantly greater than actual knowledge was not supported across the sample of teachers.

10.2.1 Knowledge About ADHD

Teachers were able to correctly answer 60.7% of the items on the knowledge questionnaire, which is somewhat better than Sciutto et al. (2000), who reported that average knowledge was only 47.8% for their sample of American teachers. However, the current findings are not as high as either Jerome et al. (1994) or Barbaresi and Olsen (1998), who reported knowledge scores of 77.5% and 77%, respectively. The discrepancy between the average knowledge score found in the present study and those reported in Jerome et al. and Barbaresi and Olsen may be attributable to methodological differences across the studies. First, only 20 items were used in the earlier two studies to assess knowledge, whereas 27 items were used in the current study. Using a greater number of items to tap ADHD knowledge might have magnified teachers' lack of knowledge in this area. Given that Sciutto et al.'s sample, whose ADHD knowledge was assessed using 36 items, scored somewhat lower in ADHD knowledge than teachers in the current study, this hypothesis seems credible. Second, ADHD knowledge was assessed in both the current study and in Sciutto et al. using three response options (true, false, don't know), whereas respondents were provided with only two response options (true or false) in Jerome et al. and Barbaresi and Olsen. Considering that teachers had a 50% chance of correctly guessing the answers in the earlier two studies, it is possible that the knowledge scores found in the current study (and Sciutto et al.) provide a more accurate account of teachers' actual knowledge of ADHD.

Considering that the methodology used in the present study was based on that used by Sciutto et al. (2000), methodological differences cannot be used to adequately explain the difference in ADHD knowledge reported in this study and in Sciutto et al. The difference between the knowledge score in this study and that reported by Sciutto and colleagues may be attributable to differences in teaching experience across the two studies. That is, 83% of the sample in the current study reported that they had taught a student with ADHD, whereas, only 52% had in Sciutto et al. Given that both the results of the present study and those of Sciutto

et al. showed that experience with teaching ADHD students was significantly associated with ADHD knowledge, it is not surprising that knowledge scores were higher in the present sample than in Sciutto et al. Further, although the knowledge scale used in the present study was based on previous empirical work, including that of Sciutto et al., the scale was not identical to those used previously. Thus, the differences in knowledge scores across the two studies might be attributable to differences in item content.

It is interesting to note that although teachers' knowledge about ADHD was not particularly high teachers did not tend to incorrectly answer the knowledge items. Rather, there was a tendency for teachers to select the don't know option more commonly than incorrectly answering an item. The distinction between don't know and incorrect responses indicates that teachers are unsure of the facts more so than having multiple misperceptions regarding the disorder. This finding is particularly important to continued teacher education in light of research showing that educating others is much easier when one does not have inaccurate preconceived ideas about a topic (DiBattista & Shepard, 1993).

10.2.2 Correlations Between Teacher Characteristics

The non-significant relationship found between years of teaching experience and ADHD knowledge does not support the findings of Sciutto et al. (2000), who reported that American teachers with greater years of teaching experience received higher knowledge scores than teachers with less teaching experience. Furthermore, the findings of the present study do not support Jerome et al. (1994), who showed that teaching experience was significantly related to overall ADHD knowledge for Canadian teachers. However, the current findings do support Jerome et al.'s finding that years of teaching experience was not significantly related to ADHD knowledge for American teachers. The methodological differences between the current study and Jerome et al. and Barbaresi and Olsen may explain this variability across teacher samples. However, given that the current study and Sciutto et al. used similar methodologies, this explanation can not be extrapolated to explain the different

findings reported by these two studies. The reasons why the impact general teaching experience had on teachers' ADHD knowledge differed across these two studies is not clear, but may include differences in teacher training across cultures. It might be that Australian teachers undergo significantly more informative initial teacher training regarding ADHD than do American teachers, and as shown in this study, Australian teachers rarely engage in additional ADHD training following employment. Therefore, it might be that Australian teachers enter the teaching workforce with an ADHD knowledge level that remains relatively constant across their career. American teachers on the other hand might receive less informative initial training, but engage in substantial additional training once employed, thereby increasing their knowledge about ADHD over time.

The present findings showed that teachers with more years of teaching experience tended to perceive themselves as having greater knowledge about ADHD than did the less experienced teachers. However, this perception was inaccurate as there was no significant relationship between actual knowledge about ADHD and teaching experience. Thus, general teaching experience does not always confer greater actual knowledge about ADHD. The reasons for the mismatch between perceived and actual knowledge are not apparent. It might be though that teachers with more years of teaching experience are more optimistic about themselves in general when compared to novice teachers, simply as a by-product of being in the same employment sector for a substantive amount of time. Having ever taught an ADHD student was significantly related to actual knowledge scores. This is consistent with Sciutto et al. (2000) who found that teachers who had prior exposure to ADHD children had significantly higher knowledge scores than teachers without such exposure. Overall, these findings suggest that exposure to children with ADHD in the classroom is an important factor in teachers' knowledge about ADHD, but that general teaching experience alone does not aid in increasing teachers' actual knowledge of the disorder.

The finding that older teachers were more likely than younger teachers to have had

greater teaching experience in general is expected. Furthermore, epidemiological data suggest that for every 100 students, five will have a diagnosis of ADHD (Barkley, 1990). Therefore, considering that older teachers have been working for a greater number of years than younger teachers, they would have taught more children in general, and thus, would have had more chance of having a student with ADHD in their classroom. An important finding from the present study was the positive impact additional ADHD training had on teachers' knowledge of ADHD. This finding supports Jerome et al. (1994), who reported that teachers who had specific ADHD training were more knowledgeable about ADHD than their less educated or less trained counterparts.

Contrary to prediction, teachers' perceived knowledge was not significantly greater than actual knowledge. Rather, teachers' actual ADHD knowledge was shown to be significantly greater than their perceived knowledge of the disorder. On average, teachers rated their perceived knowledge as 47.7%, when in fact they scored higher than this (60.7%) on actual knowledge. This meant that teachers tended to under-estimate their own knowledge about ADHD. It is important to note that this relationship was only moderate however, suggesting that other factors must also be involved. This finding does not support past research in the area of optimistic bias, which has shown that individuals generally perceive themselves in a better light than is realistic (e.g., Kos & Clarke, 2001; Weinstein, 1980; Williams & Clarke, 1997; Zakay, 1996). Two possible reasons for this disparity are variable selection/measurement and gender composition of the sample. First, the variables assessed in the current study differ to those used in the past, and how they were measured also differed. For example, past research has tended to focus on one's future risk of health-related problems, such as cancer (Kos & Clarke, 2001; Williams & Clarke, 1997) and contracting diseases (Lek & Bishop, 1995), and has generally asked participants to indicate their beliefs about their own risk of experiencing these future life events compared to the risk of an average other. On the other hand, the present study asked participants to record their beliefs about how much they

thought they knew about ADHD (a psychological disorder), and then this score was compared to the subjects' actual score on an ADHD knowledge questionnaire. A teachers' rating on perceived knowledge is a subjective measure of their own belief about how much they know about ADHD, which will be determined by what they deem as important to know about the disorder. Actual knowledge scores are a more objective measure derived from the responses given to a list of questions designed to assess the degree to which teachers know empirically validated information about ADHD.

Second, past research into the phenomenon of optimistic bias has generally included similar numbers of female and male participants (e.g., Kos & Clarke; Williams & Clarke), whereas, the sample used in the current study was predominately female. This gender discrepancy is important to note given research showing that females tend to be less optimistic than males (Seppa, 1997; Walker, Kalten, Mertz, & Flynn, 2003). It makes sense then that optimistic bias would be less likely to appear in a predominately female sample than in a more gender-equal or male-dominated sample. Therefore, the disparity between the results of the current study and those of past research in the area of optimistic bias might simply be a reflection of methodological differences (e.g., measurement and sample). Further research is thus indicated with a particular focus on different variables as well as replicating the current study with equal proportions of female and male participants.

10.2.3 Vignette Data: Accuracy of Teachers' 'Diagnosis'

With regard to the vignette data (see section 6.3.7), it is important to note that although the accuracy of teachers' diagnosis of ADHD regarding hypothetical children was less than 50%, teachers generally selected don't know rather than incorrectly assuming that a child did or did not have the disorder. This preference for selecting don't know rather than incorrectly answering an item was in accord with teachers' completion of the 27-items used to assess ADHD knowledge. Differentiating between teachers' use of the don't know option and incorrectly diagnosing a child with or without ADHD is important to know because parents

often believe what teachers tell them regarding their children (DiBattista & Shepard, 1993). Therefore, it is possible that a parent would believe their child had ADHD simply because his teacher (incorrectly) believed he did.

Two further findings from the vignette data deserve some consideration. First, teachers were able to more accurately identify female children as not having ADHD than they were for non-ADHD male children. Second, teachers had the most difficulty correctly identifying the ADHD status of the male child (Kaleb) with symptoms of inattention only, and the female child (Madeleine) with symptoms of hyperactivity/impulsivity only. These findings might be explained by the current epidemiology of ADHD subtypes across gender. First, boys are more commonly diagnosed with ADHD than are girls, both in the community (Biederman et al., 2002; Sawyer et al., 2001) and in clinic samples (Biederman et al.). Second, there are relatively few male children diagnosed with ADHD, predominately inattentive type, and there are low numbers of female children ADHD, predominately hyperactive/impulsive type (Arnold, 1996; Biederman et al., 2002). Given these data, it is possible that teachers have had limited experience teaching girls with ADHD, as well as males and females with inattentive and hyperactive/impulsive symptoms, respectively. This limited exposure may have lead to the formation of a confirmatory bias, that is, a tendency by teachers to emphasise and believe experiences that support their own views and to ignore and discredit those that do not (Aronson et al., 2004). This bias may have in turn affected teachers' perceptions and accuracy of 'diagnosing' children with ADHD.

10.2.4 Vignette Data: Classroom Management Strategies

Regardless of ADHD status, teachers most often reported that they would use strategies indicative of antecedent stimulus control (i.e., organising the classroom and curriculum) to manage the behaviour of the child depicted in the vignette. Specifically, most teachers indicated that they would 'Give simple and clear instructions' and 'Organise class seating arrangements to minimise external distractions' in an attempt to manage the behaviour

of the hypothetical child. On the contrary, punishment-type strategies were the least likely to be selected for use with the vignette child. Only a small number of teachers (19) indicated that they would 'Provide the child with extra work (e.g., writing lines or yard duty)' in an attempt to curb his problematic behaviours within the classroom. Interestingly, no teachers reported that they intended to take no action because the child was not really doing anything wrong, or to take no action because of being unsure about how to manage the child. These findings lend some support to Alderman and Nix (1997) and Greene (1995) who both reported that teachers prefer using positively-oriented rather than negatively-oriented strategies to manage children's behaviour problems in the classroom

10.2.5 Utility of the TRA and TPB at Predicting Behavioural Intention for All Teachers

Study 1 also involved an assessment of the utility of the TRA and TPB to accurately predict teachers' intention to use the five empirically validated behavioural strategies (reinforcement, negative consequences, planned ignoring, organising the classroom and curriculum, emotional support) for the student depicted in the vignette they read. The five hierarchical multiple regression analyses showed that the TRA was able to accurately predict teachers' intention to use each of these strategies. However, of all the TRA predictors and across each of the five strategies, only attitude toward negative consequences offered a significant, unique contribution to predicting teachers' behavioural intention.

The TPB offered a significant improvement over the TRA for three of the five strategies (reinforcement, planned ignoring and organising the classroom and curriculum). Further, perceived behavioural control was the only variable to provide a significant unique contribution to predict teachers' intention to use both reinforcement and organising the classroom and curriculum. For planned ignoring however, factor seven, in addition to perceived behavioural control, offered a significant unique contribution to the model. None of the predictors entered for emotional support offered significant unique contributions to the prediction of teachers' intention to use this strategy.

Finally, while the TPB did not add a significant amount of predictability to the TRA model for negative consequences, attitude and factor seven offered significant unique contributions to the overall model. Therefore, teachers' intention to use negative consequences was significantly related to their attitude toward using negative consequences and their belief that external agents (e.g., medication, policy) may be required to manage the behaviour of children with ADHD. This latter finding suggests that teachers might perceive negative consequences differently than the other strategies (see section 6.4 for further discussion).

Except for factor seven (for negative consequences and planned ignoring), the regression analyses showed that the addition of other variables, such as perceived and actual knowledge and the attitude-factors 1 through 7, did not provide a significant improvement to the TRA or TPB models. This is contrary to the findings of past research. For example, Sparks and Guthrie (1998) showed that self-identification (as a health-conscious consumer) independently predicted intention to eat a low-fat diet.

The finding that factor 7 significantly contributed to teachers' intention to use only two of the five strategies is interesting, as it indicates that teachers' beliefs about external agents being required to manage ADHD, significantly reduce their intention to use negative consequences and planned ignoring, but have little impact on teachers' intention to use reinforcement, antecedent stimulus control (organising the classroom and curriculum) or emotional support. While this finding provides theoretical implications in regard to negative consequences (see 6.4 for details), it is difficult to make the same assumptions about planned ignoring given that this strategy was assessed via only one item. Therefore, further investigation is warranted in this area and should involve a more equal representation of the strategies investigated.

10.2.6 Utility of the TRA and TPB at Predicting Intention of Teachers of ADHD Students

The utility of the TRA and TPB to accurately predict the behavioural intention of teachers' who were currently teaching a student with ADHD was also assessed. Unlike the regression analyses for the entire sample of teachers, these regression analyses showed that the TRA was only able to predict teachers' intention to use negative consequences and planned ignoring. Furthermore, attitude toward negative consequences and planned ignoring offered a significant, unique predictive element to the model for both of these strategies. The unique contribution to the model for teachers' intention to use negative consequences supports the finding from the larger sample of teachers, but not so for planned ignoring. Given that negative consequences and planned ignoring were the least favourably perceived strategies by teachers, the findings above suggest that a negative belief regarding the benefit and usefulness of a strategy can impact on intention to use that strategy. Finally, neither teacher subjective norm, nor parent subjective norm provided a significant contribution to the prediction of teachers' intent to use any of the five strategies. This finding is in accord with Armitage and Conner (2001), who reported that the subjective norm construct tends to be a particularly weak predictor of intention mainly due to the variable being too restrictive and measured poorly. The current study aimed to enhance the measurement of subjective norm by assessing teachers' perceptions across two norm groups (teacher, parent), but this was shown to add little to the models.

The TPB offered a significant improvement to the prediction of teachers' intention to use planned ignoring, organising the classroom and curriculum, and emotional support, during the next week. These findings represent two differences to those reported for the entire sample of teachers. First, the TPB was shown to increase the predictive ability of the model for reinforcement in the larger sample of teachers, but not for the smaller sub-sample of teachers who were currently teaching a student with ADHD. Second, for the larger sample of teachers, the TPB did not offer a significant improvement to the model for predicting emotional

support, but did so for the smaller sub-sample of teachers. The reasons for these differences are not entirely clear, but it is possible that teachers' who currently taught a student with ADHD held different beliefs about the behavioural strategies than did teachers not teaching a student with the disorder, simply as a result of direct experience with these children. It is also possible that those teachers actually teaching a child with ADHD have better knowledge about supports available to them and children with ADHD as a consequence of having a child with the disorder in their class.

The differences found across the larger and smaller teacher samples in terms of the TRA and the TPB may also be attributable to the different items used to assess intention. Intention was assessed for all teachers by summing the number of strategy-related behaviours they endorsed for the child depicted in the vignette they read. Whereas, teachers who were currently teaching a student with ADHD were also asked to record the degree of likelihood that they would use that strategy over the next week to manage the behaviour of a student with ADHD, and these scores were subsequently used to assess behavioural intention.

10.2.7 Attitudes Regarding ADHD

Investigation of the 31 individual attitude items showed that teachers generally held positive attitudes toward ADHD, seeing the disorder as both valid and a legitimate educational problem. However, there was a general perception by teachers that the disorder is diagnosed too frequently. This belief corresponds with the beliefs of many in society (Allen, 1995). The study also showed that whilst teachers felt strongly that students with ADHD should be taught in the regular school system, they acknowledged the difficulties with managing the behaviour of children with the disorder.

The exploratory factor analysis performed on teachers' responses to the attitudes items showed that a seven-factor solution offered the most parsimonious and interpretable model. While this model was unable to account for four of the attitude items, it explained 59.6% of the variance in teachers' attitudes. According to Tabachnick and Fidell (2001), this degree of

explanation is not very high statistically, but the amount of explained variance is quite reasonable for social psychological research (Schultz & Oskamp, 2000). The seven factors that emerged from the rotated factor solution were lack of control, negative classroom effects, diagnostic legitimacy, perceived competence, expectations, and external control. The most dominant factor, lack of control, indicated that teachers felt that children with ADHD had little control over their behaviour and that managing their behaviour is somewhat difficult, thus providing partial support for the importance of measuring perceptions of control (Ajzen, 1985, 1991a, 1991b, 1996). The second strongest factor, negative classroom effects, showed that teachers believed that children with ADHD have a negative effect on the classroom environment by being disruptive and frustrating. This finding supports Atkinson et al. (1997), who reported that teachers perceive children with ADHD as requiring extra teaching time and effort, and is also in accord with research showing that teachers often feel pessimistic about teaching children with ADHD (Kauffman et al., 1989).

Factor 3, diagnostic legitimacy, showed that although teachers believed that ADHD is diagnosed too often, they perceived the condition as a valid and legitimate diagnosis, and is therefore consistent with Orford (1998) and Allen (1995), who reported that many professionals believe ADHD is over-diagnosed. Perceived competence (factor 4) showed that teachers perceived themselves as having adequate skills and ability to manage students with ADHD. This finding is in accord with Kauffman et al. (1989), who reported that teachers believe they are competent to manage unacceptable behaviours in the classroom. Factor 5, influences to management, indicated that teachers' classroom management of a student with ADHD would not be strongly influenced by either parental or staff beliefs or the ADHD-status of a child. This factor is in accord with the results of the current study indicating the limited utility of subjective norms to the prediction of teachers' behavioural intention.

The sixth factor, expectations, revealed that teachers hold some expectations about ADHD and children with the condition. For example, teachers felt that you can't expect as

much from children with ADHD than you can from other children, and that stimulant medication should only be used as last resort. Finally, factor 7, external control, indicated that teachers hold a belief that external agents, such as medication and school policies regarding the management of students, may be required in the management of ADHD. Further, it is possible that factor 7 might explain teachers' perception about their not being influenced by parental or staff beliefs (factor 5). It might be other external factors, such as class size, monetary constraints or school policies, are more influential to teachers' management of student behaviour than are others' attitudes about what they should do.

10.2.8 Attitudes Regarding Behaviour Management Strategies

Of the five management strategies assessed, teachers reported that organising the classroom and curriculum was the most useful and beneficial technique for managing the behaviour of a student with ADHD. Teachers also perceived reinforcement and emotional support favourably. On the contrary, negative consequences and planned ignoring were perceived least favourably by teachers. These findings lend some support to past research which has shown that teachers prefer using positively-oriented rather than negatively-oriented strategies to manage children's behaviour problems in the classroom (e.g., Alderman & Nix, 1997; Greene, 1995).

10.3 Study 2: In-Service Teachers' Behaviour

Study 2, which comprised two phases, assessed teachers' behaviour toward children with ADHD. Phase 1 showed that of the five strategies investigated, reinforcement was the most commonly used by in-service teachers to manage the behaviour of a student with ADHD. Planned ignoring was the strategy used least often. It was also shown in Phase 1 that reinforcement was used significantly more frequently than either negative consequences, planned ignoring, or emotional support, and that there was not a significant difference between teachers' use of reinforcement and organising the classroom and curriculum strategies. These findings lend some support to Alderman and Nix (1997), who reported that

teachers use positively-orientated strategies more frequently than negatively-oriented strategies to manage children's behaviour problems in the classroom.

Further, given that positive reinforcement is an effective behavioural modifier for children with ADHD (Anhalt et al., 1998; Dulcan et al., 1997), the current study's finding that teachers' often use this strategy is encouraging. However, the positive influence teachers' might have exerted on children's behaviour by using reinforcement strategies in this study might not have been that substantial. According to Anhalt and colleagues, to increase the likelihood of a pronounced effect on children's behaviour, reinforcement and punishment should be used simultaneously. The data from the current study show that punishment (i.e., negative consequences) was used less than half as often as reinforcement. While each of the five strategies assessed have been empirically validated, the most appropriate strategies to use for a particular child with ADHD should ideally be determined via a thorough functional assessment. Further, effective implementation of a given strategy will be situationally dependant and this should be considered when tailoring classroom interventions for children with ADHD.

Some variables were correlated with one another. Teacher and parent norms were significantly correlated with teachers' intention to engage in each of the behaviour management strategies. However, neither of these subjective norm measures alone significantly predicted teachers' behavioural intention. Further, attitude toward reinforcement was significantly associated with teachers' perceptions of control, possible because teachers' feel that strategies are more beneficial and useful if one can control whether or not they are used. Teachers' attitude toward negative consequences, planned ignoring, and organising the classroom and curriculum were significantly correlated with teachers' intention to perform the respective strategies. Teachers' attitude toward organising the classroom and curriculum was also significantly associated with parent norm and perceived control regarding this strategy type. Overall, there were a number of significant correlations, but the variables which

correlated with one another tended to vary across the five behavioural management strategies assessed.

Phase 2 data generally supported the findings of Phase 1, showing that reinforcement was the most commonly used strategy in the classroom management of children with ADHD, and that planned ignoring was the least commonly used strategy. Teachers were also shown to be accurate at identifying the strategies they use to manage the behaviour of students with ADHD in their class. While statistically teachers were shown to use reinforcement more often than other strategies, they only used reinforcement once or twice a day. Considering that children with ADHD often require frequent reinforcement scheduling to obtain significant behaviour change (DuPaul & Stoner, 2003), it is unlikely that the behaviour of a child with ADHD would improve if a teacher reinforced him once or twice daily. Therefore, to enact significant behaviour change in these children (and all children in general), teachers need to increase their use of reinforcement considerably (e.g., at least once or twice per task). Future studies should involve the development of training packages designed to inform teachers of the importance of the repeated use of reinforcement, as well as highlighting the effectiveness of frequent use of the remaining management strategies.

10.4 Study 3: Comparison of In-Service and Pre-Service Teachers

The aims of Study 3 were to assess pre-service teachers' knowledge and attitudes regarding ADHD, and to compare the ADHD knowledge and attitudes of pre-service and in-service primary school teachers.

10.4.1 Comparison of In-Service and Pre-Service Teachers' Knowledge About ADHD

Study 3 showed for the first time that in-service teachers are more knowledgeable than pre-service teachers about ADHD. Of some concern was the finding that pre-service teachers were only able to correctly answer approximately 50% of the ADHD knowledge questions. This finding is particularly troublesome when one considers that these teachers, with inadequate knowledge about ADHD and probably no ADHD-specific teaching experience,

will be teaching students in the very near future, and will be very likely to have an ADHD student in their class (Barkley, 1998).

The second hypothesis that perceived knowledge would be significantly greater than actual knowledge for all respondents was not supported. There was a significant relationship between perceived and actual knowledge, but it was not in the anticipated direction. That is, both in-service and pre-service teachers tended to under-estimate their own knowledge about ADHD. On average, pre-service teachers estimated only 29.4% on perceived knowledge, yet were able to correctly answer 52.6% of the items. Thus, like Study 1, these findings do not support past research, which has shown that individuals generally perceive themselves in a better light than is realistic (e.g., Kos & Clarke, 2001; Weinstein, 1980; Williams & Clarke, 1997; Zakay, 1996). Possible reasons for this discrepancy have been suggested earlier in this chapter (see section 10.2). Finally, this study highlighted that a lack of ADHD-teaching experience is related to lower ADHD knowledge, and that pre-service teachers might be overly optimistic about the degree of disruption children with ADHD can cause in the classroom.

10.4.2 Comparison of In-Service and Pre-Service Teachers' Attitudes Toward ADHD

Study 3 showed that pre-service and in-service teachers generally held comparable views regarding ADHD. Specifically, both samples of teachers held strong beliefs about the legitimacy of ADHD, both in terms of the disorder itself and as an educational problem. Furthermore, both pre- and in-service teachers indicated strongly that ADHD is not merely an excuse for children to misbehave and that children with the condition ought to be educated in the mainstream education system.

There were however some items where pre- and in-service teachers' attitudes significantly differed. For example, pre-service teachers strongly believed that students with ADHD have little control over their own behaviour, that students with ADHD are just as difficult to manage in the classroom as other students, and that students with the condition

tend not to disrupt classes that much. On the other hand, in-service teachers held significantly stronger beliefs than pre-service teachers that students with ADHD have a negative impact on other students and that one should not expect as much from children with ADHD as one might from typically developing children.

In-service teachers also tended to believe in their own ability to manage the behaviour of students with ADHD to a greater degree than did pre-service teachers. Taken together, these findings show that pre-service teachers are more optimistic than are in-service teachers about teaching students with ADHD. These results may show a lack of teaching experience and a naiveté with respect to the difficulties inherent in the classroom environment on the part of pre-service teachers. For in-service teachers, attitudes may represent a by-product of teaching experience in general as well as ADHD-specific teaching experience. However, although unlikely, pre-service and in-service teachers' beliefs may simply be a true reflection of reality.

10.5 Study 4: ADHD Workshop

The aim of the workshop was to increase teachers' ADHD knowledge, and dissipate misperceptions about the disorder, both immediately (post-test) and in the long-term (follow-up). The workshop also aimed to inform teachers about, and encourage them to correctly use, five empirically validated strategies to manage the behaviour of students with ADHD.

10.5.1 Knowledge About ADHD

Study 4 showed that teachers' perceived themselves as knowing more about ADHD immediately following the workshop than they did before attending, and that this perception increased at the three-month follow-up. With regard to actual knowledge about ADHD, teachers' knowledge scores were significantly higher after the workshop than before, but decreased slightly at the follow-up. This small drop in knowledge was not significant. These findings show that simply attending an ADHD workshop can significantly improve teachers' knowledge about the disorder, and that these improvements remain for at least three months.

The ability of teachers to maintain this additional knowledge in the longer term is unknown at present. To understand the long-term effect of attending additional ADHD training on teachers' ADHD knowledge, future studies should be conducted to track knowledge scores over time (e.g., 1 year, 2 years later).

10.5.2 Attitudes Regarding ADHD

Teachers' beliefs toward the 14 attitude items remained fairly static across the 3 testing periods. There were however, three items where teachers' beliefs substantially changed across time. First, at pre-test, teachers strongly believed that their class would be disrupted if they had a student with ADHD in it. Following the workshop (post-test), the strength of this belief declined to a neutral level where it remained at the three-month follow-up. Teachers' attitude toward the statement, ADHD is diagnosed too often, was bi-modal across the testing periods. At pre-test, teachers strongly agreed that ADHD is diagnosed too often, but held neutral attitudes toward the item at post-test, and by follow-up they strongly agreed with the statement again. Finally, while teachers tended to hold a somewhat neutral attitude toward the item, students with ADHD being just as difficult to manage in the classroom as any student, at both pre- and post-test, they disagreed with the item at follow-up. The reasons for these changes in teachers' attitudes are not entirely clear. It might be that teachers were enthusiastic immediately following the workshop, and once they returned to work, the reality of the classroom environment hit them, subsequently affecting their attitudes.

10.5.3 Behaviour Strategies

Study 4 showed that teachers did not have a preference for any strategy in particular, but rather reported using many of the strategies detailed in the workshop. This finding does not correspond with the findings of Study 1, which indicated that teachers overwhelmingly used strategies indicative of antecedent stimulus control and rarely used planned ignoring. This difference might indicate differences between teachers who voluntarily attended the

workshop programs might have greater knowledge and experience with the effectiveness of behaviour management strategies, and as a result use empirically validated strategies equally as often. Whereas, teachers who refrain from attending additional training lack this knowledge and therefore engage in practices they have learned by trial and error. It might also be that the workshop effectively encouraged teachers to use a combination of strategies in the classroom management of students with ADHD. Finally, there was a similarity between the findings of Study's 1 and 4 in terms of teachers reporting a strong intention to continue using the strategies in the future. This finding is important and should be fostered in future training packages.

10.5.4 Workshop Evaluations

The workshop evaluations were overwhelmingly positive, thus highlighting that any future educative programs developed for primary school teachers should follow a similar format and content to that used for this workshop.

10.6 Methodological Limitations and Suggestions for Future Research

A number of methodological limitations have emerged from these studies. First, the in-service teacher sample used in studies 1 through 3 was restricted to primary school teachers in the Catholic and private school systems in a regional area (Geelong) of Victoria, Australia. The regional area of Geelong (the second largest city in Victoria) was selected as the population because of convenience to the author who was the sole researcher and had to visit each participating school at least twice. Most schools approached by the author (16 out of 19) agreed to participate in the study and those schools represented a cross-section of low, middle, and high socio-economic status areas, as well as diverse ethnic backgrounds. Further, the teachers involved in these studies differed in age, grade currently teaching, teaching experience in general and ADHD specific teaching experience, meaning that the samples of teachers appear representative of the wider Victorian teacher population. State school teachers were not involved in the studies because five separate attempts by the author failed to gain

approval from the Victorian Department of Education to enable these teachers to participate. Because state school teachers were not sampled, it can only be surmised that the same relationships would be found if these teachers had been included in the studies. Given that over 30% of Victorian children attend Catholic and private primary schools, one would expect the data reported in the current studies to extrapolate to the State school system.

Teachers' participation was voluntary, and there may have been some inherent differences in ADHD knowledge, attitudes and behaviour between teachers who participated and those who chose not to. However, given the relatively high response rate of teachers' participation in Study 1, the voluntary nature of the study is unlikely to have significantly impacted on the results. In addition, with regard to the correlation analyses assessing the relationship between knowledge and various teacher characteristics, the majority of significant correlations were only weak to moderate. This indicated that other variables might be associated with teacher knowledge. It is therefore suggested that variables such as time constraints, class size, limited resources, severity of student behaviour problems, and teachers' familial experience with children with ADHD be examined in future research.

The number of teachers included in Study 2 was relatively small and therefore did not permit a statistical investigation of the utility of the TRA and the TPB to predict teachers' behaviour. To enable greater statistical and theoretical understanding of teachers' classroom management of students with ADHD future research should be conducted with greater numbers of teachers (at least 100) who are currently teaching students with ADHD. Further, it is likely that a thorough functional assessment would influence teachers' selection of behaviour management strategies, however, because of time constraints these assessments were not conducted. This is therefore an important area for future research.

The small number of teachers attending the ADHD workshop may be deemed as a limitation as it is difficult to generalise the findings to the wider teacher community. Nonetheless, teachers' poor response to, and attendance at, the workshop illustrates an

important finding. Although study 1 showed that teachers want and need additional training in regard to ADHD, they did not take up the opportunity when it was offered to them. Teachers may not have attended because the workshop was scheduled at an inconvenient time or venue, because of time constraints and extreme workloads, or because they did not perceive attendance at the workshop as an important priority.

While only a small number of teachers attended the workshop, those that did were pleased they did so. Teachers reported being satisfied with the content, structure and delivery of the workshop, and their knowledge, attitudes, and behaviour toward students with ADHD appeared to improve following the workshop. The development of training packages should therefore take into account teachers' apparent reluctance to attend extra-curricula training in the area of ADHD. It is suggested that future researchers consult with teachers to devise a suitable time and place to increase teacher attendance, or alternatively, offer the program as an in-service training session.

The use of self-reporting of behaviour rather than objectively measuring behaviour is a final methodological limitation of this thesis. It is difficult to know whether teachers actually performed the behaviours they reported, and future studies should therefore devise measures to objectively observe teachers' classroom practices regarding the management of students with ADHD.

10.7 Theoretical Limitations and Suggestions for Future Research

The use of self-reported behaviour measures is also a theoretical limitation. While most studies in the literature have relied on self-reported behaviour, Armitage and Conner (2001) indicated that the TPB accounts for 11% more of the variance in behaviour when self-report measures are used than when behaviour is observed objectively. Therefore, future studies in this area should involve an objective assessment of teachers' classroom management of students with ADHD. However, caution must also be taken when directly observing another's behaviour because it is possible that a teacher might change their usual

classroom practices, either purposefully or otherwise, simply because they are aware they are being observed (Aronson et al., 2004).

The differences in the utility of the TRA and the TPB across behavioural strategies and between all teachers and those who were currently teaching a student with ADHD might be related to the measurement of the predictors contained within the models. For example, behavioural intention was measured via different items for all teachers and those currently teaching a student with ADHD, making it difficult to accurately compare data across these two sub-samples. Therefore, to increase the comparability of sub-samples, items used to assess the predictors should have high similarity across the sub-samples.

Finally, the data from this research did not support the optimistic bias paradigm, and this may have occurred for one of two reasons. The variables assessed in this research differed to those used in the past, as did the way they were measured, meaning that the findings of past research and those of the current study are not strictly comparable. Further, optimistic bias research has generally assessed equal numbers of female and male participants, whereas, the sample used in the current study was predominately female. Given literature reporting that females are less optimistic than males (Seppa, 1997; Walker et al., 2003), it is possible that the non-support of optimistic bias shown in this study is simply an artifact of a gender imbalance in the sample. To accurately report on optimistic bias regarding teachers' knowledge, future research is required and should include equal proportions of female and male participants.

10.8 Practical and Theoretical Implications

While many practical and theoretical implications have already been suggested in this chapter, there are a few others that deserve mention. First, two important findings from the present study were that additional ADHD training and experience with teaching students with ADHD were both significantly associated with in-service teachers' knowledge about ADHD. These findings have significance for continued teacher training but, given the small number of

teachers in attendance at the workshop, caution must be taken when interpreting them. Nevertheless, they indicate that additional training (e.g., workshops or seminars) specifically aimed at increasing the ADHD knowledge of primary school teachers is useful, which should also include exposure to students with ADHD. When developing additional ADHD training packages for teachers it is imperative to take into account the mismatch between teaching experience and ADHD knowledge, as well as teachers' apparent reluctance to attend additional training opportunities. To have the best chance of changing teachers' misperceptions and increasing their knowledge, the content of ADHD training packages should be both well researched and validated, and should be targeted at teachers' level of understanding.

These studies have indicated that knowledge about ADHD is likely to improve if teacher education is increased. Therefore, it is suggested that universities develop and implement core ADHD-specific units for education students. Furthermore, given the positive relationship between ADHD knowledge and ADHD-specific teaching experience, it is recommended that pre-service teachers be exposed to students with ADHD during their practical placements. With regard to in-service teachers, it is suggested that classes be organised in such a way as to maximise the opportunity for teachers to gain experience in teaching ADHD students and that extra training in ADHD be offered to all teachers.

The multiple regression analyses revealed three interesting differences. First, the ability of the TRA and the TPB to predict behavioural intention varied across the five management strategies assessed. Second, the predictive utility of the TRA and the TPB differed between the entire sample of teachers and the sample of teachers who were currently teaching a student with ADHD. Third, external factors (i.e., factor 7 from the attitude factor analysis) had a significant impact on only two (negative consequences and planned ignoring) of the five behaviour strategies. The reasons for these differences are not entirely clear. The finding that the TRA accurately predicted teachers' ($n = 120$) intention to use each of the

strategies, and the TPB predicted only three (reinforcement, planned ignoring and organising the classroom and curriculum), might be related to teachers' realistic perceptions of the degree of skills, resources, and opportunities they have regarding the use of each strategy. That is, given that the TPB better predicts more complex behaviours that require a certain level of skill, resource, and opportunity (Conner & Armitage, 1998), it might be that teachers are often given the opportunity and resources to use positive reinforcement, planned ignoring and organising the classroom and curriculum, and therefore perceive these strategies to be within their realm of competence. Whereas, teachers' may be restricted with regard to their use of negative consequences and emotional support in the classroom, and therefore have little opportunity to use these strategies. In this case, it would make sense that the TPB offered little to the prediction of negative consequences and emotional support.

While the TRA significantly predicted teachers' ($n = 120$) intention to use each of the strategies, the TRA only predicted intent to use negative consequences and planned ignoring for the sub-sample of teachers who were currently teaching a student with ADHD. This difference might highlight differing beliefs between teachers currently teaching a student with ADHD and the entire sample of teachers in regard to perceived behavioural control over the use of behaviour management strategies. The strategies that the TPB was able to predict significantly better than the TRA differed across the two sub-samples of teachers. For the entire sample of teachers, the TPB was superior to the TRA in predicting teachers' intention to use reinforcement, organising the classroom and curriculum, and planned ignoring. Whereas, intention to use organising the classroom and curriculum, planned ignoring, and emotional support were predicted more accurately with the TPB than the TRA for teachers who were currently teaching a student with ADHD.

These findings suggest that teachers who currently teach children with ADHD hold different beliefs about perceived behavioural control than do a sample of all teachers. It is likely that teachers who are currently teaching a student with ADHD will have built up the

specific skills required to offer the child emotional support. Taken together, these findings are important as they indicate that individual's perceptions and experiences are critical to the utility of the TRA and the TPB in terms of predicting behavioural intention. Finally, the correlation analyses conducted in study 2 showed that teacher and parent norms were significantly correlated with each of the behaviour management strategies. This suggests that the inclusion of two sub-elements (teacher and parent) to assess subjective norm is not warranted, meaning that a single subjective norm variable (i.e., significant others) should be used in future studies as indicated in the original theory (Ajzen & Fishbein, 1980).

10.9 Conclusions

This dissertation has shown that Victorian (Australian) primary school teachers' knowledge about ADHD was reasonable, though there was considerable room for improvement. Further, it was shown for the first time that there is a relationship between perceived and actual knowledge across in-service and pre-service teachers, although it was not in the anticipated direction and therefore did not support the optimistic bias paradigm. Teachers perceived themselves to know significantly less than they actually knew about the disorder, which may indicate that teachers are aware of their lack of ADHD knowledge.

The exploratory factor analysis of teachers' attitudes toward ADHD revealed a seven-factor solution; lack of control, negative classroom effects, diagnostic legitimacy, perceived competence, influences to management, expectations, and external control. Finally, the multiple regression analyses showed that the ability of the TRA and the TPB to predict behavioural intention varied across the five management strategies assessed, as well as across the entire sample of teachers and teachers who were currently teaching a student with ADHD. It was also shown that external factors (i.e., factor 7 from the attitude factor analysis) had a significant impact on only two (negative consequences and planned ignoring) of the five behaviour strategies.

Phase 1 of Study 2 showed that positive reinforcement was the most commonly used strategy in the classroom management of children with ADHD, and that planned ignoring was the least commonly used strategy. Phase 2 supported these findings, and also showed that teachers were able to accurately label the strategies they used. Teachers were only using reinforcement about once or twice a day however, which is unlikely to have a strong impact on altering the behaviour of a student with ADHD.

In-service teachers were shown to have significantly higher perceived and actual knowledge scores when compared to pre-service teachers. Further, although the beliefs of in-service and pre-service teachers were somewhat similar across most of the attitude items assessed, there were some differences. For example, when compared to pre-service teachers, in-service teachers believed more strongly that students with ADHD have a negative impact on other students and that one should not expect as much from children with ADHD as one might from typically developing children.

With regard to the ADHD workshop, teachers' perceived and actual knowledge significantly increased across pre- and post-test, and across pre-test and follow-up, but there was no change between post-test and follow-up knowledge (perceived and actual) scores. While attitudes regarding ADHD remained relatively constant across the three testing periods, there were three interesting differences shown. Further, teachers reported being satisfied with the content, time and location of the workshop, as well as the presentation of the material. Teachers also expressed an increased knowledge of ADHD and self-confidence in teaching students with the disorder. Finally, teachers reported using a number of the strategies covered in the workshop three months after their attendance, and stated that they intended to continue using them in the future. Considering the small sample size used in the workshop, further research is imperative to generalise this finding to a larger number of teachers.

While some of the findings from this project are comparable to those from past research, much of what was reported represents novel findings. There were a number of

methodological and theoretical limitations contained within this project, and various suggestions were offered to rectify these problems to enhance future studies in the area. Finally, practical and theoretical implications were provided to enable a better understanding of ADHD within the education system. Practical implications included the development of additional training packages for in-service teachers and the inclusion of core ADHD-specific units for pre-service teachers, as well as the importance of exposing pre-service teachers to students with ADHD during their practical placements. Implications for the theories of reasoned action and planned behaviour were suggested, and included the importance of understanding an individual's perceptions about their own skills, resources, and opportunities about performing a particular behaviour, and that assessing subjective norm as an individual factor is preferred to separating it into two components. Overall, this project has provided a much needed insight into primary school teachers' knowledge, attitudes, and behaviour toward children with ADHD, and in doing so has enhanced the literature in the area of ADHD and the education system.

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The appendices containing the instruments are not available online. If you wish to access them, please contact the author kos@acer.edu.au