Maintenance of Self-Monitoring Attention Intervention for Students with Attention Deficit/Hyperactivity Disorder

by

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Abstract

It is common to have students with ADHD involved and included in general education classrooms. To help students with ADHD regulate their behaviours and maximise their potential, behaviour modification strategies, such as self-monitoring attention, are often employed. Previous research on self-monitoring attention intervention has established that students' on-task behaviour improved when they were taught to self-monitor. However, there is insufficient research that investigates the maintenance effects of self-monitoring over time. Hence, this mixed method study explores the maintenance effects as well as the reasons for the positive or discouraging maintenance effects of the self-monitoring intervention. This study involved three participants who were students in Grades 4 and 7 of a school. Results revealed that all three improved in their on-task behaviour after they self-monitored, but only one was able to maintain the on-task behaviours when the intervention was faded. The participants' ability to maintain effects of self-monitoring is dependent on student differences. Some of these differences include the students' independent learning level, the distractibility of the intervention, a clear understanding of instructions, their cognitive systems, and disinterest in the learning activities.

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Chapter 1

What do Michael Phelps, Channing Tatum, Simone Biles, and Howie Mandel have in common? They are individuals diagnosed with Attention-deficit/hyperactivity disorder (ADHD), which is characterised by persistent behaviours of inattention, hyperactivity, and/or impulsivity (American Psychiatric Association, 2013). According to the Centre of ADHD Awareness, Canada (n.d.), this prevalent disorder affects 5% of children worldwide and is the most predominant childhood psychiatric disorder in Canada. The inattentive and hyperactive-impulsive behaviours are known to surface most prominently during the elementary grades, and they are contributing factors to poor school performance, poor conduct, organisational difficulties and complications in social development. The prevalence of the disorder increases the likelihood that general education teachers have more students with ADHD in their classrooms than in the past.

Background to the Problem

Researchers and psychologists support the view that individuals with ADHD tend to experience a more difficult time regulating their behaviour than neurotypical peers (Barkley, 1997; Barry & Haraway, 2005; Berger, 2011). In particular, Berger (2011) emphasised that behaviours which are often dysregulated in individuals with ADHD include deficits in attention and monitoring, inhibitory control, working memory, and a heightened tendency of task switching. Medication, such as Ritalin, is a common way to manage these behaviour problems associated with ADHD. However, over time, more educators and school clinicians are leaning towards the use of behaviour modification approaches to help students with ADHD increase and regulate appropriate behaviours. An aspect of behaviour modification is the formulation of self-regulation capabilities (Karoly, 2012). When students develop self-regulation capabilities, they

learn to modulate their thoughts, feelings, and behaviours, in order to achieve certain goals (Zimmerman, 2002), such as staying on-task, paying attention, or being in control.

To foster self-regulation capabilities, students are taught self-regulation techniques, such as self-evaluation, self-instruction, self-reinforcement, self-monitoring, and self-graphing. Of the self-regulation techniques, self-monitoring is the most promising strategy and has the most extensive empirical support (McDougall, Skouge, Farrell, & Hoff, 2006). Self-monitoring has been commonly employed in the attempt to help students with ADHD arrive at a more self-regulated state. Research suggested that students with ADHD benefitted more through combined treatments of medication and self-monitoring than those who relied on medication alone (Barry & Haraway, 2005). Self-monitoring is also said to decrease students' off-task behaviours during independent work (Coughlin, 2010) and improve academic performance (Rafferty, Arroyo, Ginnane, & Wilczynski, 2011).

Statement of Problem

Despite the encouraging effects of self-monitoring intervention for students with ADHD, there exists a paucity of research in regard to maintenance of the intervention over time. While research on self-monitoring is substantial, most of the studies reported on the benefits, and the successful intervention results for individuals with autism, intellectual disability, ADHD, and/or learning disabilities. Some research looked into the effects of different self-monitoring tools, such as I-Connect (Wills & Mason, 2014), or a tactile cue (Morrison, McDougall, Black, & King-Sears, 2014). Other research studied the differential effects of reinforcement (Otero & Haut, 2016) and feedback (Mouzakitis, Codding, & Tryon, 2015) on self-monitoring. However, only a small number of research studies focus on the maintenance of newly-acquired self-monitoring habits, particularly of attention, by students with ADHD over an extended period of

time. Most studies did not report if individuals had continued to self-monitor attention after the intervention or fading phases. For this reason, researchers in this area have explicitly expressed that studies on maintenance of self-monitoring intervention could be carried out in future research (Wills & Mason, 2014).

Among the few available studies focused on maintenance of self-monitoring attention, results were discouraging. A study reported some participants' difficulty in maintaining on-task behaviours, implying the ineffectiveness of self-monitoring over an extended period of time (Otero & Haut, 2016). Researchers have specified that individual differences are a critical factor in assessing the success rate of maintenance of self-monitoring intervention (Mirnasab & Bonab, 2011). However, due to a lack of research, there is a gap in understanding the reasons that discourage the maintenance of self-monitoring attention intervention effects for students with ADHD.

Purpose of the Study and Research Question

Based on the analysis of current literature, the primary purpose of this present study is to explore the effects of maintenance or sustainability of self-monitoring attention intervention for students with ADHD. Through this investigation, my intention was to determine if students with ADHD would continue using the self-monitoring attention strategy after the intervention phase, and also to understand the maintenance effects of intervention gains. The secondary purpose was to identify reasons that explain the positive or discouraging maintenance effects of self-monitoring attention intervention in the general education classrooms. From the secondary purpose, I hoped that results from this study could add to the current body of knowledge. Overall, these purposes address some of the limitations that currently exist in literature in regard

to the self-monitoring attention intervention for students with ADHD. The specific research questions constructed to address these limitations are as follows:

1. What are the maintenance effects of the self-monitoring attention intervention for students with ADHD?
2. What are the reasons for the positive or discouraging maintenance effects of the self-monitoring attention intervention?

Significance of the Study

This study on the maintenance of self-monitoring attention intervention is important to various stakeholders, mainly researchers, educators and practitioners, and students, as well as to me, the author of this study.

Significance for Researchers. As mentioned earlier, with this present study, I aim to address the limitations of current available literature regarding self-monitoring attention intervention. In this regard, the information from this study can value-add to the existing body of knowledge in that area. First, given that there were negative results of the maintenance effects of self-monitoring attention intervention in previous studies, carrying out the research allows for comparisons between present and past research to be made, interpretations to be strengthened or discovered, and generalisations to be determined. Second, by extending the study beyond current research, the existing gap of knowledge involving reasons for positive or negative maintenance of self-monitoring intervention may be closed. Hence, information from this study may be of interest to researchers who are exploring the maintenance of self-monitoring attention intervention for students with ADHD.

Significance for Educators and Practitioners. Outside of the family, the school is often the place where students spend most of their time. It is also the setting where students with ADHD learn to manage their symptoms through the help of educators and practitioners. Therefore, it is necessary that educators and practitioners know and understand the types of appropriate interventions that they can deploy to meet students' needs. While self-monitoring is seen as a beneficial and easily implemented tool, it is not a one-size-fits-all strategy for students with ADHD, after all ADHD is a complex disorder that presents itself in different ways.

Mirnasab and Bonab (2011) suggested that individual differences account for the reason why self-monitoring did not work for all the participants in their study to have them remain on-task and attentive in the maintenance phase. This implies that whether students continue to maintain using self-monitoring attention intervention is dependent on their temperament, attitude, character, and values. Understanding the reasons that influence maintenance of self-monitoring intervention is important because with the relevant knowledge, educators and practitioners may be able to comprehend the self-monitoring strategy better and cater its use with individual students according to their differences and the social influences around them.

Significance for Students. Students with ADHD struggle with self-regulation. Remaining on-task and attentive during independent work at school can be laborious for them when they lack skills to self-regulate. The difficulty in regulating their thoughts, emotions, and behaviours often result in problems, such as inappropriate behaviour, frustration, irregular motivation, and academic failure. With the increasing prevalence of students diagnosed with ADHD, it is important that students receive the appropriate intervention that they need, in order to achieve their social, psychological, and academic goals. Self-monitoring attention enables students with ADHD to achieve those goals. The eventual aim of self-monitoring is to gain self-

regulation of on-task behaviours. This study, therefore, is beneficial to students because its purpose is to study the plausibility and effects of sustained self-monitoring attention intervention. This study should be undertaken in order to benefit students with ADHD.

Significance for me. Having worked with students with ADHD, I see the continuous battle they fight with inattention and impulsivity in order to remain focused and on-task. At times, inattention and impulsivity get the better of them. During those endeavours, I sense discouragement and frustration, and I see students suffer from low esteem. Therefore, it is always a learning process for me to search for methods to help such students function positively and seamlessly in the general classroom. Doing this study will help me better understand ADHD, as well as the effects of self-monitoring on students with ADHD. Furthermore, I believe in building up students' capabilities in dealing with challenges associated with ADHD over a lifetime. It is, therefore, of interest to me to find out if the self-monitoring intervention, while it has reportedly positive effects on students with ADHD, is a strategy that can be sustained by students and is a tool that Kindergarten through Grade 12 students would want to use without much prompting from an adult.

Summary

In the move towards an inclusive education, there is a normalcy that students with ADHD are taught and included in the general education classrooms. More than ever, teachers use behaviour modification strategies, such as self-monitoring attention, to guide students with ADHD towards self-regulative behaviours, such as being attentive and on-task. Self-monitoring attention intervention has gained positive reviews due to its ease of implementation and encouraging results. However, less can be said about the impact of self-monitoring attention over time. The main critic against the intervention is insufficient research with regards to the

sustainability of the intervention. Hence, I will examine the maintenance effects of the self-monitoring attention intervention. In examining these, I will also seek to understand reasons for the positive or discouraging maintenance effects of the intervention. This study will be able to expand the pool of knowledge in this field and provide educators with relevant information about the intervention. Most importantly, it benefits students with ADHD in finding suitable strategies to help them self-regulate.

Conceptual Definitions

Maintenance: The durability of behavioural gains achieved from the intervention over a period of time (Stokes & Osnes, 1989).

Self-regulation: Modulating thoughts, feelings, and behaviours with the aim of achieving goals (Zimmerman, 2002).

Self-monitoring attention: A multi-step process where students observe their own attentional and on-task behaviour, then evaluate and self-record the occurrence or non-occurrence of the behaviour before rewarding themselves for the improvements they have made (Ganz, 2008; Niesyn, 2009).

Chapter 2

Literature Review

Chapter 2 provides an extensive review of the literature and research related to the research questions. This chapter will be divided into sections that include (a) characteristics of ADHD; (b) self-monitoring attention intervention; and (c) maintenance of self-monitoring attention intervention.

Characteristics of ADHD

Individuals with ADHD face a myriad of challenges. They are known to display behavioural difficulties, experience anxiety and depression, encounter social relationship difficulties at home and at school, and have academic problems (Barkley, 1997; Jones & Allison, 2010; Vogelgesang, Bruhn, Coghill-Behrends, Kern, & Troughton, 2016). Like most other mental illnesses, ADHD is a spectrum disorder (Hinshaw & Ellison, 2015). Individuals can have symptoms of varying degrees of deficits and impairments, even though they have the same diagnosis. Some individuals may experience persistent low levels of attention, whereas others may manifest moderate levels of attention while displaying high levels of impulsivity. In spite of the complexity of the disorder, the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5^{TM}) has classified the disorder into three subtypes, and they are *predominantly inattentive*, *predominantly hyperactive-impulsive,* and *combined types* (American Psychological Association, 2013). What does it mean to be inattentive and/or hyperactive-impulsive? The following paragraphs provide a detailed description of attention and hyperactive-impulsive characteristics associated with ADHD.

Poorly-Regulated Attention. Attention refers to the ability to focus on a selected aspect of a task or environment while suppressing the irrelevant aspects (Reid & Johnson, 2012). Individuals with ADHD have poorly-regulated systems of attention (Hinshaw & Ellison, 2015; Selikowitz, 2009). Their mechanisms for attention are not absent, rather they are simply poorly-regulated or immature. When tasks become prolonged and too demanding for immature systems of attention, they can be fatiguing for children with ADHD, who would then have to contend with poor concentration, a lack of task persistence, disorganisation, and poor working memory (Selikowitz, 2009).

Grane, Endestad, Pinto, & Solbakk (2014) compared attentional control in 36 individuals with ADHD and in 35 healthy controls by examining their performance on a Test of Variables of Attention (T.O.V.A.), which measured one's sustained attention and impulse control. The T.O.V.A required that participants respond to target signals and ignore non-target signals whenever they appeared on a computer screen. The test consisted of two parts. The first half contained infrequent target signals, and was used to detect problems of inattention. The second half contained frequent target signals, and was used to detect impulse control. The results demonstrated that the ADHD group had less speedy reactions than the control group during the first half of the task. This meant that individuals with ADHD faced more problems of inattention than neurotypical peers. Furthermore, when the task increased in the frequency for participant response in the second half, the ADHD group had more inconsistent reaction times and made more omission errors than the control group. This implied that individuals with ADHD had more impulsivity, and when activities become prolonged and demanding, sustained focus and attention for individuals with ADHD are affected.

In a traditional general classroom, where importance is placed on focus and attention, students with ADHD face more difficulties concentrating and maintaining attention than their neurotypical peers (DuPaul & Stoner, 2003; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005). As a result of poorly-regulated attention, students with ADHD are often confused with instructions (Selikowitz, 2009), and have a higher risk of low academic achievement and grade retention (Reid & Johnson, 2012; Barkley, 1997).

Attention in ADHD can present itself in multiple ways. Reid and Johnson (2012) described four types of attention that are associated with individuals with ADHD: sustained, alternating, focused, and selective. Sustained attention refers to an individual's ability to persistently concentrate to the end of a task, particularly when the task is repetitive, unappealing, and unstimulating. Children who are struggling with alternating attention will find it hard to shift their attention between tasks that demand their attention on different parts of an activity, such as reading word problems and applying math skills in an activity. Children who are lacking in focused attention do not have the ability to focus on a specific aspect of a situation or task and respond accordingly to it. Finally, children with a deficit in selective attention will have trouble blocking out distractions and maintaining focus on a particular task. Among the four types of attention, sustaining attention is said to be the most difficult attainment for children with ADHD. Because most children with ADHD experience the most challenge sustaining attention, they have a hard time with task persistence.

Hyperactivity-Impulsivity. Children who are hyperactive have a tendency of displaying inappropriate levels of activity. Selikowitz (2009) explained that hyperactivity is the result of an immaturity in parts of the brain that control movement. Typically, hyperactivity in children with ADHD results in constant fidgeting and squirming, and leaving their seats when remaining

seated is expected. Often, children who are hyperactive become visibly restless during activities that require sustained attention (Reid & Johnson, 2012; Roberts, Milich, & Barkley, 2015).

Children who are impulsive have poor inhibition and are more prone to be led by their instincts and urges (Reid & Johnson, 2012). Children's impulsiveness is revealed in the way they act, think, and feel, and it is attributed to an under-developed frontal lobe of the brain (Castellanos, et al., 2002). A study by Castellanos et al. (2002) was conducted to compare cerebral volumes of 152 children with ADHD and 139 children without ADHD. Using scans, they concluded that children with ADHD had three to four percent smaller total cerebral volumes than children without ADHD. Since the frontal lobe of the brain controls behavioural inhibition (Barkley, 1997; Selikowitz, 2009), children with ADHD are affected in the way they control their behaviour. In this aspect, they do not stop to think before acting. In fact, they have a propensity to respond in a reflexive way at inappropriate times. Examples include interrupting conversations, and not waiting for his or her turn in a game. Poor behavioural inhibition can lead to attention problems that are displayed by individuals with ADHD (Reid & Johnson, 2012). Such hyperactivity and impulsivity is the result of a deficit in the individual's executive functioning (Barkley, 2015), which implies that the individual's self-regulation and sustained attention abilities, among others, are affected (Weyandt & Gudmundsdottir, 2015).

Summary. ADHD can become a serious disability in traditional school environments that emphasise the capacity to sit still and be on-task for long periods of time. Given that classrooms are often filled with many distractions, students with ADHD operate better if they receive one-to-one instruction (Selikowitz, 2009). However, this is not an inclusive arrangement for students with ADHD. Taking into consideration that children with ADHD face a higher risk of academic and social complications due to their difficulty regulating attention and behavioural

inhibition, teachers have a responsibility to ensure that students with ADHD will be able to ameliorate their attentional and hyperactive-impulsive behaviours, so that they can cope with the academic and social demands.

Self-Monitoring Attention Intervention

Self-Regulation. Two main modes are typically used to help children with ADHD manage their behaviours: medication and behavioural interventions. Between the two modes, behavioural interventions are more prevalently deployed in schools due to a growing evidence that supports the impact of behavioural intervention for students with ADHD (Fabiano et al., 2009). Self-monitoring strategy is a form of positive behavioural intervention (Ganz, 2008), and it is commonly used by students with ADHD. Self-monitoring is a component of the larger concept of self-regulation (Rafferty, 2010), which is also known as self-management, or self-control.

Definition and Aim of Self-Regulation. The concept of self-regulation has been discussed in cognitive, emotional, and behavioural aspects of the human conduct. For this reason, there is no one definition of self-regulation since the definition is dependent on the aspect of human conduct that is being discussed. Hence, self-regulation is broadly defined as "the ability to monitor and modulate cognition, emotion, and behaviour to accomplish one's goal, and/or to adapt to the cognitive and social demands of specific situations" (Berger, 2011, p. 4). In other words, individuals self-regulate when they adapt their actions and behaviour according to the needs of the situation or to social norms, so that they may achieve their goals. For example, a self-regulated child is able to wait for his or her turn to speak in a conversation, because he or she has internalised the social norm of not interrupting a conversation. Children with ADHD struggle with self-regulation, and in this case, they may interrupt the conversation. Therefore, the

aim of self-regulation interventions for children with ADHD is to "monitor, evaluate, and/or reinforce their own behaviours" (DuPaul, Weyandt, & Janusis, 2011, p. 35). Learning to self-regulate is important for children with ADHD because it is seen as a life-long learning skill, necessary for independence and achievement of goals.

Development of Self-Regulation. One of the underlying mechanisms responsible for the development of self-regulation is the orienting of attention (Berger, 2011; Fonagy & Target, 2002). In a study to investigate the effect of attention on self-regulation, researchers found that infants' distress disappeared when caregivers redirected the infants' attention to a new stimulus (Berger, 2011). The external act of redirecting infants' attention was used to regulate the distressed state of the infants. As the infants became toddlers, they internalised a certain level of regulation over their cognitive and emotional abilities. They were able to redirect their attention, although they still relied on caregivers to maintain control in the face of distress or challenge. It was noted that when most children joined preschool, they entered a self-regulated phase, in which they were aware of rules, and were able to use the right attentional strategies to guide their behaviour. This, in Berger's (2011) view, is the development of self-regulation from an external control to an internalised control of attention. Unfortunately for children with ADHD, the development of self-regulation is compromised due to a deficit in the executive function (Barkley, 2015; Berger, 2011), which is a set of cognitive abilities used to develop self-regulation over time, so that goals may be accomplished (Barkley, 2012; Hofman, Friese, Schmeichel, & Baddeley, 2011).

Developing Self-Regulation in Children with ADHD. Fortunately, self-regulation in children with ADHD can be fostered. Regulatory skills can be developed in stages: Observation, emulation, self-control, self-regulation (Zimmerman, 2005). It starts off with the observation

phase, in which children with ADHD observe the main features of behaviour or skill to be learnt from a proficient model. At the emulation phase, children with ADHD learn the behaviour and skill by imitating the model and re-enacting the behaviours. Attainment of self-control happens when children model the behaviours and skills in the absence of the model. During this phase, children with ADHD are displaying the behaviours and skills independently under structured conditions. Finally, when the children adapt their behaviours accordingly to contextual conditions, they will be able to function at the self-regulation phase. Despite the neatness of the self-regulatory phases, Zimmerman (2015) asserts that attainment of self-regulation is still dependent on personal and environmental factors.

Components of Self-Regulation. Self-regulation consists of several interventions: self-monitoring, self-reinforcement, self-evaluation, self-instruction, and self-graphing (Morrison et al., 2014; Rafferty, 2010). Among the interventions, self-monitoring is viewed as one of the first steps taken towards self-regulation (Schunk, 2001), and is commonly used in general classrooms to develop students' skills such as attention, time on-task, academic performance, and the amount of work completed. Numerous studies have provided supportive evidence of the self-monitoring intervention with students with ADHD (Otero & Haut, 2016; Pfiffner & DuPaul, 2015; Rafferty et al., 2011; Rafferty & Raimondi, 2009; Wills & Mason, 2014).

Self-Monitoring. Self-monitoring is defined as a multi-step process where students observe their own behaviour, then record the occurrence or non-occurrence of the behaviour (Ganz, 2008; Niesyn, 2009; Pfiffner & DuPaul, 2015). Through self-monitoring, individuals pay attention to aspects of their behaviour, and in doing so, they influence the actions that are necessary for self-directed change (Bandura, 1986). Self-monitoring involves self-observation, and self-recording. The act of self-observation allows individuals to reflect on their behaviour,

the conditions that surround it, and the effects of the behaviour. It also involves having individuals evaluate if their behaviour matches up to target behaviours (Bandura, 1986). Self-recording allows for pertinent information to be captured at certain moments. The information captured may serve to highlight the conditions that surround the behaviour, or become a database for identifying elements for improvement (Zeidner, Pintrich, & Boekaerts, 2005). In self-observation and self-recording, individuals provide self-feedback. Self-feedback is important because it allows individuals to take corrective action in their behaviour in a timely manner (Bandura, 1986; Zeidner, Pintrich, & Boekaerts, 2005). Individuals monitor their progress and adapt their actions and behaviours better in the midst of an activity when they self-feedback than when they receive delayed feedback from others.

Types of Self-Monitoring. There are two types of self-monitoring interventions, namely self-monitoring attention (SMA), and self-monitoring performance (SMP). The former is usually used by the individual to assess his or her attention on a task whereas the latter involves having the individual self-monitor the amount of work done or the accuracy of his or her efforts in the task (Reid, Trout, & Schartz, 2005). In a study by Harris et al. (2005) that involved six elementary children diagnosed with ADHD, effects of SMA and SMP on their on-task behaviour and spelling accuracy were examined. All six students relied on medication, and faced difficulties in completing written tasks, spelling, paying attention, and maintaining self-control. In the SMA component, students were put through a spelling study period. They were taught to record their behaviour as either on-task or off-task whenever a taped tone was heard at every 3-second intervals within a 10-minute period. As for the SMP component, students were taught to count the number of times the spelling words were practiced correctly.

The average percentage of on-task behaviour rose from 55% at baseline to 92% during SMP intervention and to 94% during SMA intervention. The average score of correct practices also increase from 38 at baseline to 83 and 114 during SMP and SMA interventions respectively. The authors found that both interventions had a positive effect on the on-task behaviour of students with ADHD and their spelling performance. In addition, the authors interviewed students after the intervention, and they learnt that students were more receptive to SMP than SMA intervention because they felt that the SMA method was boring and distracting. This study shows that despite the gains made during intervention, students preferred SMP to SMA. The reasons for SMP preference over SMA may explain the unfavourable maintenance effects for SMA intervention

Self-monitoring Device. Self-monitoring intervention was traditionally administered with a cueing system, such as a pre-recorded tone from an audio player, and students typically had to wear headphones to hear the cues (Graham-Day, Gardner, & Hsin, 2010). Wearing the headphones during self-monitoring can be stigmatising for the student because of the way it singles out the student (Bedesem & Dieker, 2014). To address this, covert cueing devices that emit a vibration to cue the students to self-monitor their behaviour were introduced. Examples of such devices are cell phones (Bedesem & Dieker, 2014), and apps, such as the MotivAider® (Amato-Zech, Hoff, & Doepke, 2006), I-Connect (Wills & Mason, 2014), and SCORE IT (Vogelgesang et al., 2016).

Studies were conducted to investigate the effects of such devices, and results showed that using a covert device had the same effect as a traditional cueing system in increasing on-task behaviours. In fact, because it was less stigmatising, covert devices were perceived to be more acceptable. An example of such a study is carried out by Amato-Zech et al (2006), who involved

three fifth-grade students with low levels of on-task behaviour. A device called the MotivAider®, which looked like a pager and was attachable at the belt or waistband, was used. It emitted vibrations to cue students to monitor and record their behaviour. Before self-monitoring, students' on-task behaviours averaged 55%. When they self-monitored, their on-task behaviours increased to more than 90%. The findings reflected similar positive findings when compared to traditional cueing systems, such as a kitchen timer, headphones and tape recorders, or teacher prompts. The researchers also assessed acceptability of the intervention by having three teachers and the students complete questionnaires. Teachers gave high acceptability scores of a mean of 105 out of 120, specifying that the intervention was easy and that they would be willing to use the intervention in the classroom setting again. Students' acceptability scores were an average of 33 of 42, and they expressed that they liked the intervention, and did not think there were better ways to help their inattentive behaviour.

Self-Monitoring Attention Process. Bell, Magill, Carter, & Lane (2013) delineate the process of self-monitoring attention intervention. For effective self-monitoring, intervention should be used consistently and overtly at the beginning, and then faded to less frequent and more subtle use over time. The steps of the self-monitoring attention intervention is described as follows:

1. Define target behaviour to self-monitor.

   From the start, the teacher and student should come together to discuss and identify the target attention behaviours to be addressed. Examples include staying off-task and leaving the seat. The teacher and student discuss what the behaviour of concern looks like and sounds like to form a consensus about the descriptions of the behaviours. They then discuss and perhaps

role-play and observe appropriate replacement behaviours, such as keeping their eyes and mind on the speaker, and repeating important words to themselves.

2. Teach self-monitoring procedures to students.

   Next, the teacher teaches the student the self-monitoring procedures, which include evaluating the target attention behaviours and recording them on a self-monitoring form. The student will learn to monitor himself or herself when he or she is cued at timed intervals within a period of time. The cue usually comes from a device that signals a recorded beep tone or a vibration. At the cue, the student will have to assess if he or she is displaying the replacement behaviours, and record his or her response on the form. For example, if the student's behaviour of concern is the lack of control to stay on-task, the form will include the question "Are you on-task?" and the student will indicate in the "yes" or "no" box with a tick. After which, the student will refer to a prepared chart to remind him or her about the replacement behaviours.

3. Monitor student progress.

   Once the student is clear about the self-monitoring procedures, the next stage is to monitor student progress. At this point, the student begins to emulate target behaviours, and monitor himself or herself during scheduled time periods in the general classroom context. At the same time, the teacher fills out the same monitoring form during the student's self-monitoring phase to match the student's accuracy. If there is inaccuracy in student's recording, the teacher will have to review with the student the importance of being accurate. The data collected will be compared to baseline data, which is collected before the start of the intervention, to assess progress.

4. Maintenance and follow-up.

   Once the student grasps the procedures and becomes more independent in self-monitoring, the teacher can begin to fade support in the last stage, which is the maintenance phase. During this stage, the student would have self-monitored attention successfully and consistently, and improvements of on-task behaviour are visible. Self-monitoring will be faded gradually by lengthening the self-monitoring intervals, or reducing the number of self-monitoring sessions (Menzies, Lane, & Lee, 2009). In some cases, fading can also involve reducing the frequency of the reinforcement or increasing the efforts to achieve the same level of reinforcement.

Benefits of the Self-Monitoring Attention Intervention. Self-monitoring is an appealing strategy because of the benefits it offers students and teachers. Self-monitoring intervention can be implemented effortlessly in an existing curriculum, as seen in several studies, in which self-monitoring was carried out in reading classes (Bruhn & Watt, 2012), spelling tasks (Harris et al., 2005), science classes (Morrison et al., 2014; Wills & Mason, 2014), and math classes (Cook, 2014). Furthermore, the process is easily adapted to meet the needs of students with varied disabilities, such as mild cognitive impairments (Coughlin, McCoy, Kenzer, Mathur, & Zucker, 2012), autism spectrum disorder (ASD; Mouzakitis et al., 2015), emotional disturbance (ED; Theisinger, 2014), and ADHD. In addition, self-monitoring can be carried out for students across different school-age groups: at the preschool (Ganz, 2008), elementary (Vogelgesang et al., 2016), high school (Morrison et al., 2014), and college levels (Scheithauer & Kelley, 2017). From the substantial studies above, self-monitoring intervention is versatile and can be implemented across diverse populations, age groups, and settings.

Self-monitoring has the potential to help students with ADHD remain on-task and improve results in a repetitive task. In a study by Rafferty et al. (2011), three elementary students diagnosed with ADHD and three comparison neurotypical peers participated in the self-monitoring study to measure on-task behaviour. The students with ADHD had a history of off-task behaviour during independent spelling practice, and had spelling scores that were at least one year below grade level. The comparison peers were selected on the basis of a history of high levels of on-task behaviour during spelling practice, but had spelling scores that were at least one year below grade level. Only students with ADHD were taught to use the self-monitoring attention intervention. All six students learnt a six-step spelling strategy prior to the start of the intervention. Students learnt that on-task behaviour was defined as writing on the spelling practice list or self-monitoring card, looking at the list or self-monitoring card, implementing the steps of the spelling strategy, and asking the teacher for directions by raising his or her hand and waiting quietly.

Students learnt how to self-monitor upon cue from interval tones, and once they could perform each step of the intervention successfully, they carried out the self-monitoring intervention in the general classroom during spelling practice. After implementing the intervention and comparing the students' results to their baseline data, the authors found that students with ADHD improved on their on-task behaviour from an average of 46% to 84% while the comparison peers' on-task behaviour remained high from an average of 92% to 96%. The study also looked into the accuracy of students' spelling after the self-monitoring implementation. Results show that the spelling accuracy of students with ADHD increased over the weekly tests. This study concludes that self-monitoring attention strategies have the potential

benefit to students with ADHD in helping them gain on-task behaviours, and have academic gains while completing a monotonous, and perhaps uninteresting, task.

Self-monitoring is beneficial to students because it develops their self-regulation and independence. The ultimate goal of self-regulation of behaviour is for students with ADHD to know when and how to adapt to the demands of specific situations, so as to accomplish social and/or academic goals. To achieve this, students need to have initiative, responsibility, and independence, which can be developed through self-monitoring (Bialas & Boon, 2010). When self-monitoring is implemented, the onus of academic learning and improving on social behaviours is on the students. Students shoulder the responsibility of monitoring themselves, thus decreasing the reliance on external agents, such as teachers, educational assistants, and parents (Amato-Zech et al., 2006; Otero & Haut, 2016).

Self-monitoring is beneficial to teachers because it is easy to implement, and it is a time-efficient intervention. Since self-monitoring requires students with ADHD to take on the proactive role of managing their behaviours, this leaves teachers to use classroom time more effectively to provide instruction, and to spend less time managing students' off-task and inappropriate behaviours (Bialas & Boon, 2010). As iterated in the *Self-Monitoring Device* section above, three teachers who participated in a self-monitoring intervention study shared that the intervention was easy to implement with their students and implementing it was less demanding on the teachers' time. They expressed a willingness to use the strategy again (Amato-Zech et al., 2006).

Summary. Students with ADHD face challenges in self-regulating their behaviours. Self-monitoring is a common intervention employed to foster self-regulative attention and on-task behaviours. Various research point to the positive effects and versatility of self-monitoring

intervention used across different populations, age-groups, and settings. In particular, research on self-monitoring attention intervention has been successful in increasing on-task behaviours in students with ADHD. Available research also highlights the benefits of self-monitoring, which includes academic gains, an ease of implementation, encouraging students' independence, and more efficient use of class time.

Maintenance of Self-Monitoring Attention Intervention

Having seen the favourable effects of self-monitoring attention intervention, it is equally important to ensure maintenance of the intervention gains after the implementation phase. Maintenance refers to the durability of behavioural gains achieved from the self-monitoring intervention across time (Stokes & Osnes, 1989; Swan, Carper, & Kendall, 2016). During the maintenance phase, students would have already demonstrated desired behaviour, it would be the time to fade the support provided, and let students maintain the gains from self-monitoring independently (Menzies et al., 2009). Establishing maintenance of intervention effects is important because the goal for students with ADHD is to develop their self-regulation capabilities in behaviour, so that they are able to perform socially and academically at an independent level.

Plan for Maintenance. The maintenance phase of the intervention process involves a variety of fading methods. An example of a fading method is to increase the self-monitoring intervals, such that students hear the tones or feel the vibration at longer intervals (Bedesem & Dieker, 2014). Similarly, there can be a reduction in the frequency of self-monitoring sessions (Menzies et al., 2009), which means that students self-monitoring once a week, instead of five times a week. Gradually removing components, such as reinforcement, is another way to fade the support (Menzies et al., 2009). Alternatively, increasing the goals, such that the student has to

reach higher goals in order to obtain reinforcement, can be done (Ganz, 2008). Another option is to reduce teacher mediation slowly, so that the student gains confidence being responsible for completing procedures on his or her own (Bruhn, Waller, & Hasselbring, 2016).

Concerns about Self-Monitoring Intervention. Despite the numerous articles describing the ways to ensure maintenance, and delineating the importance of maintenance of behaviours gained from the self-monitoring intervention, there is a paucity of research that discusses the maintenance of intervention gains. Questions about the maintenance of intervention effects are not clearly answered.

Insufficient Research on Maintenance. A substantial percentage of studies about self-monitoring intervention has been carried out. As described above, a large part of research on self-monitoring includes studying the effects, and demonstrating the positive intervention results for individuals across a variety of disabilities. There is also research that studied the effects of technology-based self-monitoring devices or apps for students with ADHD. Research that studied the differential effects of reinforcement (Otero & Haut, 2016) and feedback (Mouzakitis et al., 2015) on self-monitoring are available. However, majority of the research does not include studies on the maintenance effects of intervention gains.

Generally, studies that evaluate maintaining gains over a long term are few, and Swan, Carper, and Kendall (2016) listed logistic difficulties, ethical issues, and financial expenses as some of the limitations associated with a long-term study. What's more, these studies stopped short of investigating the maintenance of behaviour, in particular for students with ADHD. In fact, researchers in this area have explicitly expressed that studies on maintenance of self-monitoring could be carried out in future research. For instance, in the study by Rafferty et al. (2011) that was described in the *Benefits of the Self-Monitoring Attention Intervention* section of

this literature review, the authors affirmed that the on-task behaviour for each student had increased, and they had achieved higher scores in their spelling accuracy practice by the end of the intervention phase. However, due to the short duration of time allocated to the study, the authors did not study the students' ability to maintain intervention gains and acknowledged that the absence of studying the durability of the self-monitoring intervention was a limitation of the research.

Similarly, Harris et al. (2005) conducted their study to investigate if there were differential effects of SMA and SMP on the students' on-task behaviours. As described earlier in the *Types of Self-Monitoring* section, by the end of the study they found that while both SMA and SMP had a positive effect on students' on-task behaviour, SMA was not a preferred strategy when compared to SMP because students found SMA boring and distracting. However, the authors were not able to continue their investigations to examine maintenance of intervention gains due to time constraints. They recommended that "future research needs to investigate effective weaning and maintenance of intervention effects, as well as support for generalisation" (p. 155). Due to the lack of research in this area, it is difficult to determine if SMA is a suitable long-term strategy.

In another study, Graham-Day et al. (2010) studied how self-monitoring intervention with reinforcement affected on-task behaviour and academic performance of three Grade 10 students with ADHD. The self-monitoring strategy was taught to a class of thirteen students who received special education services. Data collection was done only for three of the students because of their high incidence of off-task behaviours. During the self-monitoring phase, students indicated if they were on-task when they heard the audio chime every two minutes within a 20-minute period. The self-monitoring with reinforcement phase was similar to the self-

monitoring phase, except that it included positive reinforcement for the students' accuracy in recording their behaviour in the self-monitoring form. At the end of the study, the researchers found that students' on-task behaviours increased as a result of self-monitoring from an average of 48% to 77%. All three students were further motivated by the idea of reinforcement and this reflected further gains of an average of 85% in on-task behaviour. However, Graham-Day et al. found that there was no correlation between on-task behaviour and improved academic performance. They also pointed out that they were not able to collect data regarding maintenance of behaviour due to the time constraints of the school year. These researchers supported the idea that there was inadequate information regarding maintenance, and that studies should be conducted to fill the gap in the current body of knowledge.

Difficulty Maintaining Effects of Intervention. Of the studies that evaluated the maintenance effects of self-monitoring intervention, the results were not promising. Table 1 shows a summary of studies that explored the maintenance effects of the intervention.

Table 1. Summary of studies that addressed maintenance effects of self-monitoring intervention.

Author	Design	Population	Results
Amato-Zech, Hoff, & Doepke (2006)	ABAB reversal	3 elementary students with low on-task behaviours	Increase in on-task behaviours whenever intervention was used. Slight decrease in on-task behaviours when intervention was withdrawn. Second baseline levels were higher than first baseline levels.
Holman & Baer (1979)	Multiple baseline	6 preschool students with disruptive off-task behaviours	Increase in on-task behaviours during intervention. Maintenance effects were different for students.

Mirnasab & Bonab (2011)	Multiple baseline single subject	4 elementary students with ADHD	Increase in on-task behaviour during intervention but effects returned to baseline levels after intervention phase.
Otero & Haut (2016)	Alternating treatment	3 elementary students with high levels of off-task behaviours	Increase in on-task behaviour during intervention but effects returned to baseline levels after intervention phase.
Vogelgesang, Bruhn, Coghill-Behrends, Kern, Troughton (2016)	ABAB plus maintenance	3 elementary students with ADHD/at risk for ADHD	Increase in academic engagement during intervention phases. Effects were either maintained or had a slight drop.
Wills & Mason (2014)	ABAB withdrawal	2 high school students with ADHD & learning difficulty	Increase in on-task behaviours but unclear improvement when intervention was withdrawn.

Otero & Haut's (2016) study studied the differential effects of reinforcement on self-monitoring. Three participants who were identified for persistent off-task behaviours in class were selected for the study. They adopted an alternating treatment design, such that two conditions, self-monitoring without reinforcement and with reinforcement, were randomly manipulated before the start of each observation session. During the intervention phase, it was found that when participants monitor without reinforcement, their on-task behaviour increased from baseline performance. With reinforcement, participants were further motivated to improve their on-task behaviours. Due to time constraints, the study did not include a maintenance period on the research design. However, based on teacher direct observations and social validity interviews with the teachers, they found that students' on-task behaviour returned to baseline levels when the intervention was withdrawn and students were not self-monitoring. It was

suggested that self-monitoring intervention was not effective over an extended period of time, and maintaining treatment effects was difficult for some students. The lack of positive encouraging results in the maintenance phase is not an indication that self-monitoring is a useless intervention. Rather, more research needs to be conducted to understand the reasons behind the discouraging results for maintenance of the intervention effects. Understanding these reasons might be a more useful piece of information for practitioners than simply knowing that the intervention gains cannot be maintained. That way, practitioners will be able to consider changing their practices in order to help students maintain intervention gains.

Possible Reasons for Difficulty in Maintenance. Of the research that talked about maintenance of the self-monitoring intervention, three studies highlighted the possible reasons for students' difficulty in maintaining intervention effects. Mirnasab & Bonab's (2011) study, which involved four participants with ADHD, adopted a multiple baseline single subject design. Participants' inattentive behaviours were first observed during the first baseline phase. In the intervention phase, they were observed as they self-monitored. Finally, in the follow-up phase, participants returned to baseline conditions, in which self-monitoring was withdrawn. Mirnasab & Bonab (2011) gathered that self-monitoring effects occurred during the intervention phase, and not the maintenance phase. They suggested that individual differences of students receiving treatment is a consideration in ensuring acceptance and maintenance of treatment. The study by Harris et al. (2005) supports this suggestion. It was noted that one of the students found the intervention distracting. The student might be someone who would get distracted easily, so he would require a more seamless intervention that cut the distraction out. In contrast, the other three participants in the study indicated that they did not find the intervention distracting and, in fact, liked hearing the tones because the tones helped them to stay on-task. While this

intervention would work for them in the long run, it would likely not be sustainable for the particular student who was distracted.

In another study, Holman & Baer (1979) studied the durability of the intervention effects over a period of at least five months for three participants who demonstrated a lack of independent work skills and high levels of disruptive off-task behaviours, and three other participants with normal behaviours. They found that all the participants improved in on-task behaviours by an average of 55% from baseline levels. Due to subject attrition, the results of three participants were reported in the study. During the initial follow-up phase, two of the participants, John and Leon, maintained high stable levels of on-task behaviours when they were given the self-monitoring tool. However, when the tool was withdrawn, their on-task percentages deteriorated. On the other hand, another participant, Len's on-task percentages improved slightly when the tool was withdrawn. In the subsequent follow-up phase, the researchers looked into the data of John and Len. They realised that Len self-monitored and stayed on-task when John was carrying out self-monitoring procedures. Likewise, he did not self-monitor and was off-task when John did not self-monitor. This study suggested that peer influence and dependence on the self-monitoring cue affects the maintenance of intervention effects. Needless to say, these three studies imply that individual differences may be a plausible reason to explain the difficulty in maintaining intervention effects. However, more research is needed to confirm this interpretation and discover more in-depth explanations to the issue of maintenance.

Summary. Maintenance of self-monitoring intervention effects is as important as the intervention gains. Being able to maintain effects over a long period of time does not only help students with ADHD remain more effective in working towards social, emotional, and academic goals, it develops their ability to become more independent in managing their attention,

hyperactive, and impulsive behaviours. However, research regarding maintaining intervention effects for students with ADHD is scarce due to time constraints faced in the school year. Available research on maintenance for students with ADHD highlights discouraging results of the intervention in the long run. In spite of the unfavourable results, it would be helpful to understand the possible reasons for students' difficulty in maintaining intervention effects, so that the self-monitoring intervention can be enhanced for use in and outside of the general classroom.

Overall Summary

ADHD is a common disorder that affects 5% of children worldwide (CADDAC, n.d.). Most children with ADHD struggle with self-regulation. Due to their difficulty regulating attention and behavioural inhibition, they face a higher risk of academic and social complications. To help them cope with the academic and social demands, educators and practitioners have adopted behavioural techniques that regulate their attentional and hyperactive-impulsive behaviours. Self-monitoring is a common intervention employed to foster self-regulative attention and on-task behaviours. Many studies about self-monitoring have been conducted, and they have demonstrated its effectiveness in increasing attention and on-task behaviours, increasing positive social habits, improving academic accuracy and results, and decreasing undesirable behaviours. The effectiveness is applicable across different age-groups, settings, and populations. From available research, self-monitoring has shown its benefits for students with ADHD.

Despite the encouraging results from self-monitoring, research that focuses on the maintenance effects of the intervention has received scarce attention. Moreover, the few available research that studied maintenance effects of self-monitoring reflect unpromising

results. Instead of writing this intervention off as ineffective, it would be more beneficial to discover the possible reasons for students' difficulty in maintaining intervention effects. By understanding these reasons, teachers and practitioners may be able to modify their practices according to the differences of each individual with ADHD, in order to enhance the self-monitoring intervention for them.

Chapter 3

Methods

The purposes of this study are to explore the effects of maintenance of the self-monitoring attention intervention for students with ADHD, and to examine the reasons for the presence or absence of the maintenance effects. To achieve these purposes, research that focused on maintenance of the self-monitoring attention intervention was carried out. This chapter provides a detailed description of research methods for this current study. Sections in this chapter include (a) philosophical approach to research; (b) research design; (c) participants; (d) investigative techniques; (e) procedure; (f) instrumentation; (g) data analysis plan; (h) ethical considerations; (i) validity; (j) bias; (k) assumptions; and (l) limitations.

Philosophical Approach to Research

In discussing my philosophical approach, I have examined my perspectives in terms of epistemology and ontology. I appreciate statistics and see its value in providing objective data in research and in life. This, according to Saunders, Lewis, & Thornhill (2009), implies that I have taken a positivist approach, which sees reality as observable and stable, and the knowledge from research is often scientific and "law-like" (p.127). Having said that, I am not content to view myself as a positivist, because I also tend to see that the world functions in a more in-depth subjective manner. The way an individual responds to an event can be different from another and even if he or she responds in a similar manner, the motivation and reason to respond in that way may be different. Individuals hold subjective perceptions of their world and responds according to those perceptions. Saunders et al. (2009) describe this mindset as interpretivism, which emphasises humans as "social actors" (p. 130). Under this paradigm, "reality is socially

constructed" (Merriam, 2009, p. 8). Yet, I am not completely an interpretivist, although I am more inclined towards an interpretivist philosophical paradigm. In view of this, I conclude that my philosophical approach to research rests in the pragmatism paradigm, which combines both positivism and interpretivism positions in a study (Saunders et al., 2009).

Research Design

The purposes of the study are achieved through a mixed methods approach, specifically, with a sequential explanatory design. A sequential explanatory design is "characterised by an initial quantitative phase which is then followed by a qualitative data collection phase" (Kroll & Neri, 2009, p. 41). In the first part of the study, I examined the maintenance effects by measuring the level of on-task behaviour displayed from the baseline phase to the intervention phase, and finally to the maintenance phase. At each phase, the number of times students displayed on-task behaviours during each session were collated, and the numbers were converted to percentages, so that comparisons between the phases could be made. This will reflect the quantitative aspect of the study. More importantly, I would like to determine the reasons behind the maintenance effects, so students were observed and interviewed during the second part of the study. Through the observations and interviews, qualitative data was obtained.

Participants

Participants were selected based on convenience sampling, which allows researchers to gain more insight from information-rich cases. Participants were selected based on the criteria that students have an ADHD classification. A summary of inattention and/or off-task behaviours are as shown (Shapiro, 2011):

a) requiring constant verbal prompts and reminders to remain on task;

b) easily distracted by peers and surroundings;
c) disengagement for at least 3 seconds (e.g. spacing out or day-dreaming);
d) movement that is not relevant to the task at hand (e.g. randomly shaking a classmate's chair); and
e) verbal behaviours that are not relevant to the task or not permitted (e.g. calling out answers).

In addition, since participants would be interviewed at the end of the intervention, students aged between 9 and 13, and enrolled in grades 4 to 8 were recruited. Students at this age group were preferred because they would have developed the skills to reflect upon their experiences, and convey their reflections and thoughts clearly. Gender and ethnicity of the participants were not target characteristics in this study and would not be considered.

To conduct the study in a school, a letter to obtain approval was sent to a school division. Upon approval from the superintendent, permission from the principal to carry out the study in the school was obtained. The school possessed a strong team of learning support teachers, who have provided support to class teachers in responding to their students' needs.

Once permission was given, a recruitment and information letter, as well as consent form, were translated to Tagalog and Punjabi language, due to the large percentage of Filipino and Punjabi students in the school. A package, containing the English, Tagalog and Punjabi versions of the recruitment and information letter, the consent form, and an assent form, was also sent to students, in grades 4 to 8, who were asked to hand the package to their parents.

Approximately 450 recruitment packages were sent out to all the students in grades 4 to 8. Three parents/guardian whose children/ward have ADHD and who agreed to the conditions in this study responded to the study. A phone survey conducted with the parents/guardian

confirmed that their children/ward had the ADHD diagnosis and regularly had difficulty staying focused and on-task. Having met the criteria, their children/ward were accepted as participants. All three participants assessed the language arts, maths, and science general education curriculum in the general education classroom. They were taking medication for ADHD for the duration of the study. Table 2 provides a summary of the participants involved in the study.

Table 2. Participant Information

Pseudonym	Gender	Grade	ADHD Medication	IEP
Nico	M	4th	Yes	Yes
Ethan	M	7th	Yes	Yes
Aliya	F	7th	Yes	Yes

Investigative Techniques

The study consists of two questions.

1. What are the maintenance effects of the self-monitoring attention intervention for students with ADHD?
2. What are the reasons for the positive or discouraging maintenance effects of the self-monitoring attention intervention?

To answer the first question, data on participants' level of on-task behaviour during baseline, intervention, and maintenance phases were collected. The independent variable is the self-monitoring attention intervention that was taught to participants while the dependent variable is the participants' on-task behaviour. On-task behaviour is generally described as (a) the participant's eyes are directed towards the task (glancing away for 3 seconds or less is still

considered on-task); (b) listening and paying attention to the speaker; (c) responding appropriately and timely to questions and in discussions; (d) ignoring distractions; and (e) actively or passively engaging in assigned task. Participants self-monitored their on-task behaviours during independent work sessions by counting the frequency of on-task behaviours. Direct observation of participants self-monitoring was conducted in the class by me. Each self-monitoring session was 20 minutes, and such sessions were conducted four to five times a week. The frequency count of on-task behaviours was converted to percentage to reflect the levels of on-task behaviours at each phase.

The second question was answered by conducting an interview with individual participants to understand their experiences and attitudes towards self-monitoring and their views on maintaining this intervention. An interview was selected for this study because it provided rich detailed descriptions (Merriam, 2009), such that it allowed me to understand thoughts, ideas, and responses that were not directly observable (Stake, 2010). Interviews were preferred because its interactivity allowed me to probe for clarity and complete answers that may not be easily understood through a static data collection method. Being able to access participants' thoughts and interpretations of reality directly through interviews improved validity of the study (Merriam, 2009). A semi-structured interview was employed, because while it consisted of key questions that defined the interview, being semi-structured allowed me the flexibility to pursue a participant's response in greater detail (Merriam, 2009). Each audio- recorded interview with the participant took up approximately 20 minutes.

Procedure

The process followed a structure that involved the baseline, intervention, and maintenance phases. It was followed by an interview with the participants. The phases and interviews, which were scheduled at the participants' convenience, are shown in Table 3.

Table 3. Details of phases and interviews.

	Nico	**Ethan**	**Aliya**
Baseline	May 22 – 30	May 15 - 24	Sept 11 - 18
Learning	Sept 4 -21	Sept 18 -19	Sept 4 – 21
Intervention	Sept 24 – Oct 3 (every 2-minute interval)		
Maintenance	Oct 15 – Oct 18 (every 4-minute interval)		
Interview	Oct 18 – 19		

Baseline Phase. During this phase, self-monitoring procedures were not in place. Baseline data about the participants' on-task behaviour was monitored in the general classroom by me. I noted and counted the number of times participants remained on-task during each 2-minute interval within a 20-minute session. This was conducted for five sessions, such that a stable trend could be identified. Ethan and Nico responded to the recruitment call earlier and the baseline data collection began in May. Aliya responded to the study later and her baseline data collection process began in September. Throughout the baseline data collection phase, participants had not received any instruction from me. During observations, I positioned myself at different spots behind the participants such that I was still able to see their eyes and the tasks they were working on.

Intervention Phase. In this phase, the self-monitoring procedures were put in place. Approximately 15 to 30 minutes were allocated to teach participants to self-monitor. This process was carried out at the participants' convenient time and place, so that they would not miss classroom instructional time. Together with individual participants, target behaviours were identified and defined. Participants observed what on-task behaviours looked and felt like. Participants were taught to self-monitor using a monitoring form and an interval timer, which served as a designated cue. A reminder chart was provided to remind participants of the appropriate behaviours to emulate. Participants learnt that when they felt the vibration signal from the interval timer, they would have to evaluate their behaviour based on the question "Are you on-task?" and record their response in the self-monitoring form.

Once participants showed proficiency in carrying out self-monitoring, they began the self-monitoring independently in their classrooms. A checklist was used to confirm that participants were proficient in self-monitoring. Participants knew that when it was time to self-monitor, they would proceed to take out the timer and forms from their cubbies or file boxes, start the timer by themselves, and monitor until the end of the session. There were five sessions, with each session taking up 20 minutes. There were ten 2-minute intervals in each session. A frequency count reflecting the number of times each participant displays on-task behaviour was collected by the participants. At the same time, as an observer, I used the self-monitoring form and observation guide to monitor the participants. This ensured that there was a level of accuracy in participants' self-monitoring and an alignment in their perception of on-task behaviour. If there were any misalignment of participants' perception of on-task behaviour, clarifications were made with the participants before continuing in the intervention phase.

Maintenance Phase. During this phase, self-monitoring procedures were gradually faded while encouraging participants to continue maintaining target behaviours. Instead of self-monitoring at 2-minute intervals, participants did so at 4-minute intervals within each 20-minute session for at least five sessions. Direct observations of participants' on-task behaviours were made during each session. Upon completion of these sessions and tabulation of frequency count of the number of times that on-task behaviours have occurred, the maintenance effect of on-task behaviours for each participant was identified.

Interview. A semi-structured interview was conducted with each participant to understand their experiences as they employed the self-monitoring intervention, the reasons why they would use or not use the intervention over a longer period of time, and the conditions that motivate participants to continue maintaining on-task behaviours. The interview with each participant, which was audio-recorded, was around 20 minutes.

Instrumentation

Proficiency checklist. To confirm that participants were able to carry out self-monitoring competently on their own, the following checklist was used by me to assess their readiness.

Participants should be able to carry out the following self-monitoring steps without prompts:

- □ Turn on/off the device and app.
- □ Select the vibration mode.
- □ Select the correct duration and interval.
- □ Place the device in a way such that the vibrations can be felt.
- □ Identify on-task and off-task behaviours appropriately.
- □ Indicate observed behaviours correctly on the self-monitoring form.

- □ Re-focus after every vibration cue with the use of the FOCUS reminder chart.
- □ Respond to queries from other people about self-monitoring process, the use of the device and form while in class.

Designated cue. This study used an interval timer (Appendix A) as the designated cue. It has the option of sounding a beep tone or silently vibrating to alert the participant to self-monitor at preset intervals for a period of time. Earlier research described the feedback from participants that the traditional beep tones gave the participants unnecessary attention. With this in mind, this study used the vibration function as the designated cue. The device was placed in the participants' pocket, so that they may be alerted by the vibration.

Self-Monitoring form. Upon sensing the vibration from the device, participants were required to indicate a response to the main question "Are you on-task?" in their self-monitoring form (Appendix B). The participants put a tick in the "yes" or "no" columns to reflect their behaviours at the point of each cue. The total number of ticks in the "yes" column were converted to percentage, which was used for comparison in the different phases.

FOCUS reminder chart. A reminder chart (Appendix C) was enlarged and placed at a notice board in front of the class to remind and steer participants towards the desired on-task behaviours.

Observation guide. This observation guide (Appendix D) is modified from a handbook for the Behavioural Observation of Students in Schools software (Shapiro, 2011), which was used to observe students and record their behaviours in a school environment. The handbook provided a list of student behaviours that constituted active and passive engagement in assigned

tasks. This observation guide was used by me when participants were self-monitoring in the intervention and maintenance phases.

Interview guide. An interview guide (Appendix E) was used during the interview with participants. The questions in the interview guide were used to find out (a) participants' experience as they employed the self-monitoring intervention; (b) the reasons why they would use or not use the intervention over a longer period; and (c) the conditions that will encourage them to continue maintaining on-task behaviours. All the questions in the interview guide were asked during the interview except for the following two questions:

1. Do you think your on-task behaviour has increased, stayed the same, or decreased from the start to the end? Can you tell me why you were more/less on-task then? (Show graph of participant's on-task behaviour from baseline to intervention to maintenance phases) Look at your on-task behaviour at these points, do you agree with your earlier description? Why do you say so?
2. (If there were significant changes in participant's behaviour pattern) What has happened during this time that you monitored yourself?

These two questions were omitted because by the time the interviews were carried out, it would have been days or weeks that had passed and participants would not be able to remember exactly what had happened on specific occasions.

Data Analysis Plan

The data collected for the first question of the study was from participants' self-report, in the form of their self-monitoring forms. Nominal data, which answers the question "Are you on-task?" and generates a "yes" or "no" response, was collected. A frequency distribution was used

to tabulate the number of "yes" responses at each session of the baseline, intervention, and maintenance phases. Percentages of on-task behaviours were calculated and graphed on a line graph using Microsoft Excel to represent the relationship between self-monitoring intervention and effects of on-task behaviour. The mean of percentages of on-task behaviours at each phase was also calculated. Analysis was based on the comparisons of on-task behaviours in all the phases. The minimum and maximum percentages were noted, as they may provide useful information in explaining situations with extreme on-task or off-task behaviours.

The other half of the study to answer the second question was analysed using the quantitative data, transcripts of the interview as well as notes taken during direct observations of the intervention sessions in the classroom. To analyse data, it is necessary to consolidate and scrutinise data, code and categorise the data for themes, and finally interpret the themes to make meaning for the study (Merriam, 2009). In this study, the interview was transcribed manually. After which, the transcripts were coded with comments and notes. Open coding was adopted at the beginning. Common concepts and ideas were categorised into themes, which were synthesised contextually and with past research to provide interpretations for the study.

Ethical Considerations

Ethics approval from the Education Nursing Research Ethics Board (ENREB) at the University of Manitoba was sought (Appendix F). Written approval to conduct research and observations in a school was also obtained from the school division. An email was sent to the principal to obtain written permission to observe participants in the school (Appendix G). Upon approvals from the superintendent and principal, a package, containing the recruitment and information letters (Appendix H), parent consent form (Appendix I), and child assent form (Appendix J), was sent to students in grades 4 to 8. Students were asked to hand the package to

their parents. A letter was used to obtain written permission to observe participants in the class from the relevant teachers (Appendix K). Parents, whose children have ADHD and who agreed to the conditions in this study, contacted me directly. The participants' suitability was verified through a phone survey (Appendix L). Participants, their parents or guardians were informed that participation was voluntary and they could withdraw from the study at any time without penalty. Pseudonyms were used to protect participants' anonymity during and after the research. Information and data collected (e.g. audio recording, transcriptions) pertaining to participants were treated with confidentiality. Since I was not a teacher of the participants, I was not in any position of power vis-à-vis the participants.

Another way to ensure that the study is conducted in an ethical manner is to exercise accountability, which refers to the responsibilities that the researcher has towards the stakeholders in the study (Given, 2008). Accountability towards the participants of the study can be in the form of member checking, in which transcripts of interviews are reviewed by the participants to check for accuracy and authenticity of the transcriptions. Member checking improves credibility as well as validity of the study. For these reasons, I factored in a member checking practice with the participants after transcripts of the interview were completed, and thereafter made relevant changes based on participants' comments. Transcripts were emailed to participants and their parents. They were informed that they had one week to edit the transcripts and communicate the changes via email. For parents without email access, a printed copy of the transcripts was ready to be hand-delivered and picked up from them.

Validity

Besides member checking as a means to improve validity, triangulation is another strategy commonly used to improve validity of the research findings (Creswell & Plano Clark,

2007). Using solely one method for data collection can result in a study that lacks rigour. Creswell and Plano Clark (2007) suggest that using more than one method of data collection can allow convergence of data, so that a more comprehensive interpretation can be made. In this study, I triangulated the data collected from direct observations and interviews.

Bias

Bias may unconsciously surface in this study due to possible errors while gathering and analysing observational data. Bias may be influenced by the researcher's age, gender, social class, values, schemas, and expectations (Given, 2008). In my case, being a researcher with a cultural background different from the typical Canadian, it is possible that certain observations may be recorded as significant while others may be perceived as unimportant. In an attempt to reduce bias, I made use of an observation guide. At each interval during the participant's self-monitoring sessions, I referred to the observation guide to obtain concurrence on the behaviour observed.

Assumptions

The following assumptions are made in this study:

1. Participants fully understand the questions that they were asked during the interview.
2. Participants completed the self-monitoring forms and answered interview questions in a truthful and frank manner.

Limitations

The small number of participants intended for this study can be a potential limitation because the small number may not be representative of the population of students with ADHD.

In doing so, it is argued that generalisability of the results of this study to a larger population is affected. However, it can also be argued that the small number of participants allows for implementation of the intervention to be carried out with fidelity.

Chapter 4

Results

In this chapter, a description of the effects of the self-monitoring attention intervention on participants' on-task behaviours is reported. More importantly, quantitative analysis and a description in regard to the maintenance effects of the intervention is presented. Additionally, qualitative analysis of the data will be put forward to suggest factors that affect maintenance effects.

Effects of self-monitoring intervention

The frequency data of individual participants' on-task behaviour during all the baseline, intervention, and maintenance phases are shown in Figures 1 to 3. Prior to the introduction of the self-monitoring intervention, all three participants had not been taught self-monitoring strategies. Overall, baseline data reflected that participants' on-task behaviour scores had ranged from 20% to 100%. When participants were introduced to the self-monitoring attention intervention, all three of them showed an improvement in their focus and on-task behaviours from the baseline phase to intervention phase. On-task behaviour scores for participants ranged from 80% to 100% during the intervention phase. At the maintenance phase, different participants' focus and on-task behaviours yielded different results. On the whole, participants' on-task behaviour scores ranged from 20% to 100% during the maintenance phase. Data results from baseline and intervention phases are presented individually as follows:

Nico (pseudonym). Prior to the intervention, observing Nico in and outside of classroom activities revealed that he was a dependent learner. Over many instances, he relied on repeated direct instruction from the teacher to carry out his tasks. At times, without a person to provide

the one-to-one instruction, Nico can be off-task. For example, he may be well-behaved and seated at his table, but he was considered to be off-task when he was spacing out for more than three seconds, instead of completing his writing task. Generally, Nico put in effort and responded to instructions very well on activities that he enjoyed, such as drawing, and acting out a skit. As for activities that he did not enjoy as much, such as participating in group discussions, he put in minimum effort, became less enthusiastic and distracted, and unresponsive to the teacher's questions at times. Nico can be very focused on a single task at times. During a session, in the midst of a journal writing task, Nico became so absorbed in his task that he continued writing and did not listen when the teacher gave further instructions to the whole class. In groups or whole class activities, he did not participate as much as his peers. However, when the teacher specifically called on Nico to share in a whole class discussion, he was able to speak about the topic. From the baseline data collected, Nico's on-task behaviour score was in the range of 30% to 90%. The mean of his on-task behaviour during the baseline phase was 64%.

I introduced the self-monitoring intervention to Nico first at home at the start of Grade 4 and subsequently, I continued teaching him to self-monitor in his classroom during lessons. After almost three weeks of guiding him in monitoring and identifying on and off-task behaviours, he displayed competence in self-monitoring in accordance to the checklist, he was then asked to carry out self-monitoring on his own. Nico responded very well to the intervention for the first two sessions. During the two sessions, he was involved in an independent writing activity and group activities that required him to share his thoughts in a group, and listen to different speakers. Nico showed that he was on-task; his eyes were not glazed, and they were actively following the different speakers and the writing on the board. He was also participating in the

small group Spirit Buddies sharing by talking about his experiences. He received guidance in his writing tasks and was able to complete them.

Subsequent sessions in the intervention phase indicated a drop in Nico's on-task behaviour score. On the third session, the class watched a video about Orange Shirt Day. After which, the teacher had a discussion about it with the students. Nico was staying on-task at the start of the session. He was responding to the teacher and he displayed positive body language to learning. However, as time went on, he started to lose the energy to stay focused. He was seen taking out the self-monitoring timer of his pocket several times to look at it before placing it back into the pocket. By the end of the session, he showed disinterest in the lesson. Similarly, during the fifth session, his on-task behaviour dropped to 40%. The teacher had to address him specifically to provide guidance and bring his focus back on his work. When I spoke to Nico after the session, he commented that he had wanted to look at the timer. Data collected during the intervention phase indicated that his on-task behaviour averaged 78% and ranged between 40% and 100%.

Ethan (pseudonym). Besides observing Ethan in his usual classroom, he was also observed in Band class and Technology and Applied Arts (TAA) class. He demonstrated interest in the TAA class, which was Foods and Nutrition. He was on-task and followed instructions to clean the table and prepare utensils. However, during his ELA and Science class work, which involved listening to readings and different speakers, discussing topics, sharing opinions, responding to questions, and watching videos, Ethan was mostly disengaged and off-task. His back would be facing the teacher when she was reading a book and discussing its content with the students. Instead, he would be doing his own things, like eating, and cleaning his mess on the table. With his back facing the teacher, he would not have known what the teacher was pointing

or referring to. Ethan was also expected to complete an independent writing activity. He had a propensity to stall for time. When he did start writing, he was on-task for less than a minute, then quickly became distracted by peers, a pencil that he was using to write with, and the on-goings in and outside the class.

Ethan's on-task score during Band lesson, which was his first baseline observation session, was 20%. It can be argued that he did not know have the knowledge and skills to play the musical instrument, and he appeared off-task as a result. The intention of collecting baseline data was to find out the participant's on-task behaviour in a classroom setting, where he had the knowledge and skill to carry out tasks. In this case, the Band task was not a reflection of the participant's ability to stay on-task and so the score has been omitted in the baseline average score. Regardless, the inclusion of the score would not have changed the overall results. Baseline data results excluding that session indicated that his on-task behaviours averaged 45% and the range of his on-task behaviour was between 30% and 70%.

As part of the training process, I taught Ethan to identify on-task and off-task behaviours, to monitor himself accurately as he sat through his grade 7 lessons, and he was taught to refer to the FOCUS chart if he found himself off-task to help direct his focus back to the task. In almost three weeks, he showed that he was able to monitor himself competently. In the first session of this phase, he was involved in activities that required him to listen to the teacher and respond to the discussion. He exhibited on-task behaviour by following instructions. At one point during the session, he went away from his usual table, so that he could sit in front of the whiteboard while the teacher was teaching. His eyes were focused on the speaker, and he even attempted to respond to the teacher's questions.

During the other sessions, Ethan showed that he was able to monitor in the initial segment of a lesson. He would be paying attention to the teacher or video, and attempting to complete tasks when direct instruction was given. It was noted that he was able to be on-task at the start of a session. However, he had a tendency to lose his focus in the later part of the session. It was also observed that he had a habit of stalling and becoming off-task whenever he encountered a difficulty in completing his work. Once he was off-task, he would be fiddling with things on his table. Overall, his on-task behaviour during the intervention phase improved to a range of between 60% and 100%. He averaged 78% in on-task behaviour occurrence.

Aliya (pseudonym). Aliya was a soft-spoken person, who was motivated in learning. During lessons, she demonstrated independence in learning, and was able to stay on-task. However, she had mentioned that she always had distracting thoughts, and at times, she felt that she could not focus as well because her classmates talked as her teacher was teaching. Aliya shared:

> *Like I can't…can't focus well because it…every time the teacher talks, every time the people just talk when the teacher is talking and that makes me not focused.*

During the first session of the baseline phase, Aliya was mostly on-task, and became slightly distracted when noise levels increased in the class. In the second session, she was initially on-task; she was listening, her eyes were looking at the speaker and on the board, and she was checking her work against the answers on the board. Halfway into the session, she independently started to work on a worksheet. She appeared to be struggling with a math question. She looked around and did not proceed with her work. It seemed that she was getting frustrated and affected perhaps, by my presence, or by the teacher who was talking to students in the other grade in the same classroom. Apart from these incidences, she generally displayed

focused and on-task behaviours, with scores that ranged from 60% to 100% and with a mean score of 90% during the baseline phase.

Aliya was taught by me to self-monitor in her grade 7 class. She was quick to learn the intervention and displayed competency in self-monitoring after two sessions. During the intervention phase, Aliya was engaged in mostly independent tasks that required her to write and complete math questions. Her on-task behaviour stayed consistently at 100% for all the days that she was observed during the intervention phase. She could be seen following instructions, completing tasks, listening and paying attention. She appeared motivated to improve academically.

Maintenance effects of self-monitoring

The maintenance phase began twelve days after participants completed five sessions in the intervention phase. The following paragraphs describe the participants' on-task behaviour during the maintenance phase. A more in-depth interpretation of these descriptions will be discussed in Chapter 5.

Nico. The mean of Nico's on-task behaviour decreased from 78% in the intervention phase to 68% in the maintenance phase. The on-task behaviour scores ranged between 40% and 80%. This mean score was 4% higher than his baseline mean score, which meant that Nico's on-task behaviour had almost returned to the level before the introduction of the intervention. Nico managed to achieve an average on-task score of 80% in three out of five sessions. He was involved in activities that required him to write, listen, and participate in classroom discussions. During a session where the teacher was reading and showing students a picture book, he appeared interested and was looking at the pictures. During the other two sessions, it was

observed that with guidance from the teacher, Nico was able to participate in class and stay on-task most of the time.

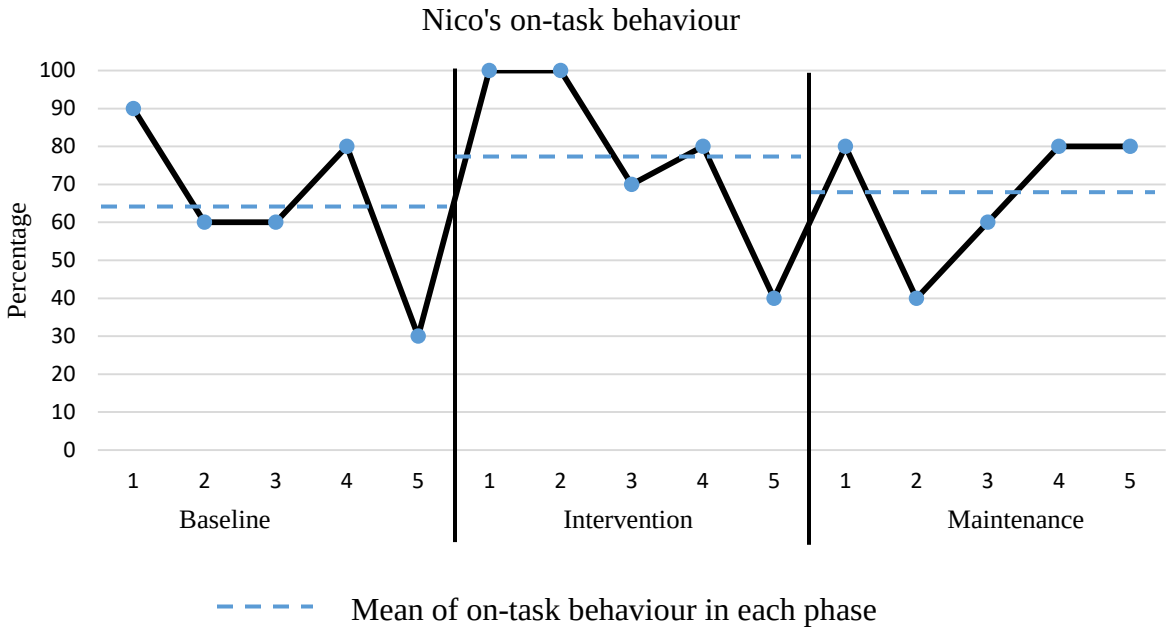


Fig. 1. Percentages of Nico's on-task behaviour for each session of the baseline, intervention, and maintenance phases.

As for the second and third sessions, Nico had a below average score of 40% and 60% respectively. During that second session, the class was listening to a story read by their teacher. Nico had a glazed look in his eyes, and appeared uninterested in the story. He did not respond to the exciting part of the story nor was he able to respond to the teacher's questions about the story. He appeared to be more interested in the self-monitoring form and timer than listening to the story. During the third session of the maintenance phase, students were involved in art work after finishing their writing in their writer's workshop. For the first part, Nico showed disinterest in listening and writing, and was disengaged during the writer's workshop. However, when the lesson transitioned to art, he became more on-task and motivated.

Ethan. During maintenance phase, group activities included sharing opinions, listening to peers during sharing circle, and performing a skit. Individual activities included writing, and creating art work. Ethan's on-task behaviour generally improved except for a dip on one of the days. During Ethan's fourth session in the maintenance phase, his on-task behaviour was at a low of 20%. When I arrived and before the monitoring started, it was noted that Ethan was already off-task in the classroom activity. During monitoring, as the class watched a video, and thereafter, shared their thoughts about the contents of the video in a sharing circle, Ethan was not engaged in the activities. He fiddled with tangrams on the table while the video was being played. As his classmates gathered to share in the sharing circle, he was clearly disengaged; he was walking behind the room, stayed outside the circle, and fiddled with things at the back of the room. A short debrief after the session revealed that Ethan did not like to participate in big group discussions.

With the exception for that day, Ethan's on-task behaviour on the other days of the maintenance phase was in the range of between 80% and 100%, and this implied that Ethan was generally able to maintain on-task behaviours even when the intervention was fading. It was noticed that Ethan was able to complete his task when he received assistance from the teacher. Once he had understood what was required of him, he was able to stay on-task even when the teacher had walked away from his table. Ethan was also more on-task when he was interested in the activity. During one of the sessions, he was involved in a group presentation. He showed interest, and was engaged most of the time. However, due to the fourth session, the mean of his on-task behaviour for all five sessions during the maintenance phase was 72%. Although this signalled a drop in on-task scores of 78% from the intervention phase, it showed an improvement since the baseline score, which was at 45%.

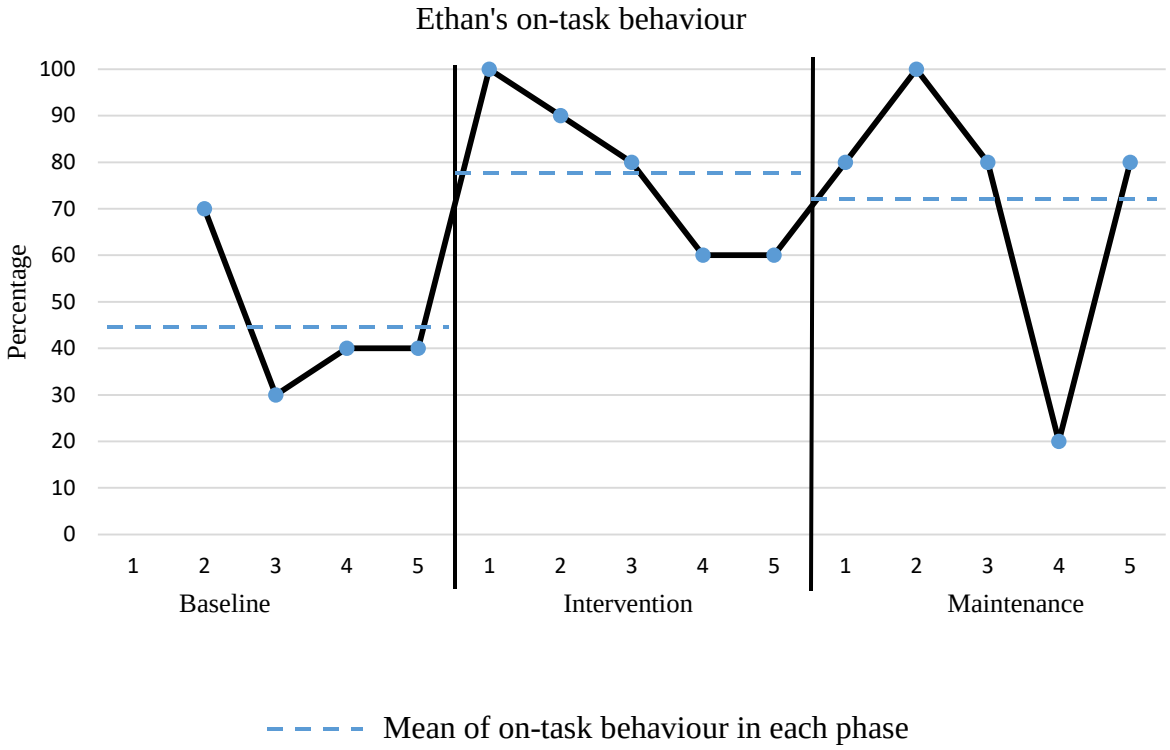


Fig. 2. Percentages of Ethan's on-task behaviour for each session of the baseline, intervention, and maintenance phases.

Aliya. During maintenance phase, Aliya demonstrated an independent attitude towards her studies as well as self-monitoring. When I mentioned that in the new phase, the timer would vibrate every four minutes instead of two, she was quick to attempt to change the settings of the timer. With verbal instructions, she was quick to learn and able to do it on her own. Aliya paid attention to the teacher, and displayed on-task behaviour. She was particularly attracted to the use of the Chromebook for independent learning. In fact, she was more focused on the Chromebook than on self-monitoring, to the extent that she took a while after the timer vibrated to check herself on the self-monitoring form. After a while, there was a switch and a classmate beside Aliya used the Chromebook while she worked on a worksheet. Aliya was momentarily distracted by the sounds coming from the Chromebook. Despite this, she was able to bring

herself back to task and check herself at each interval. Her focus and on-task behaviour stayed consistently at 100%.

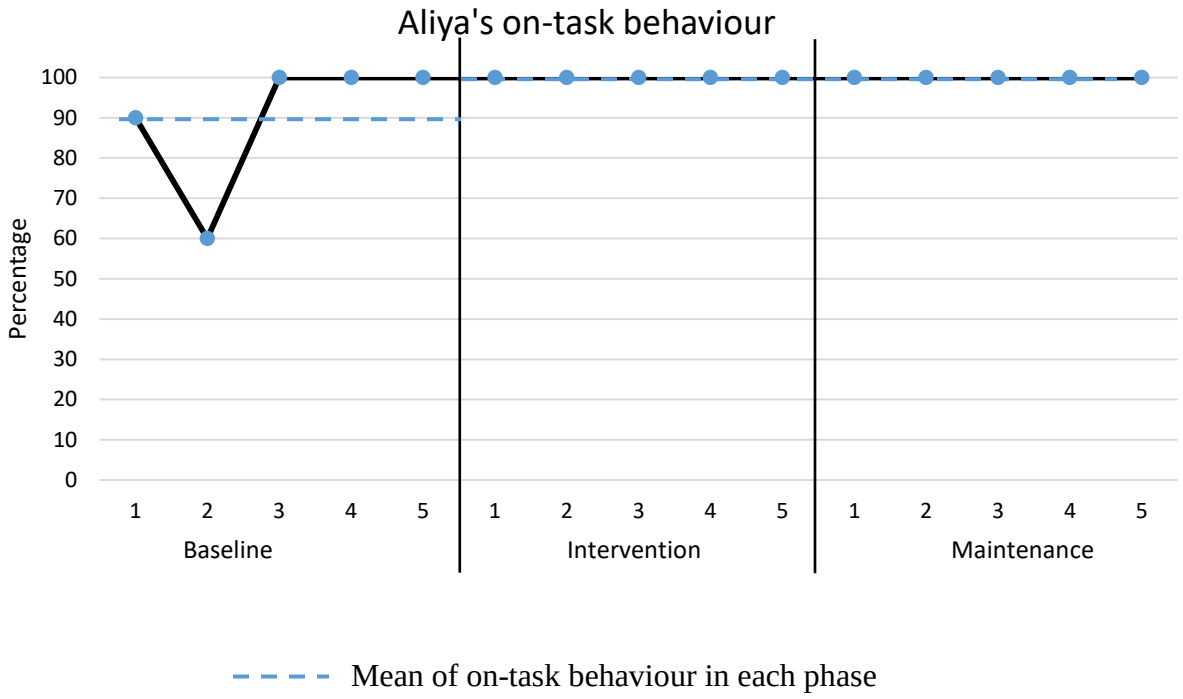


Fig. 3. Percentages of Aliya's on-task behaviour for each session of the baseline, intervention, and maintenance phases.

Impact of intervention on Ethan and Aliya. From the data, Aliya has managed to maintain effects of self-monitoring intervention because her on-task scores maintained at 100%. Ethan, on the other hand, had on-task scores that dropped from 78% to 72%. It can be interpreted that Ethan had a harder time maintaining intervention effects. However, in considering the impact of the intervention on both participants, it was noted that Ethan had a 33% improvement in on-task behaviour scores compared to baseline scores while Aliya had a 10% improvement. This implied that the intervention had a greater impact on Ethan and benefitted him more than it had on Aliya, whose baseline and intervention scores were high to begin with.

Reasons for maintenance effects

Based on the observations, interviews, and participants' on-task behaviour scores, themes were derived. The themes are described in the following paragraphs.

Distractibility and selective attention. All three participants responded positively toward self-monitoring. Aliya and Ethan commented that they liked it because it helped them to focus on their teachers. Nico revealed that he enjoyed using it to help him to stay on-task. Like Nico, Ethan felt that self-monitoring had helped him to stay on-task. He shared that through the monitoring, he had managed to complete all his work on one of the days. All of them agreed that self-monitoring was easy to carry out.

Asked if there was anything they did not like about the intervention, Aliya highlighted:

> *It's difficult like when there's grades 7s on the math thing, it's a little bit frustrating because I had to bring my paper all the way there and have to bring it back and forth.*
>
> *It is a little bit embarrassing because every time it beeps, erm, some people look and just…what's that beeping coming from.*

As the self-monitoring timer created a low-level buzz as a result of the vibration, Aliya did not like it when her classmates beside her asked her about the buzz. She was embarrassed by the attention she was receiving as a result of the buzz. She also found that the preparation for self-monitoring was disrupting as it meant that she had to stop whatever she was doing to take the monitoring forms and timer from her work bin at the back of the class and prepare for monitoring in the midst of her lessons. Despite all of these, as soon as the timer began, Aliya remained undistracted by the intervention.

As for Ethan, he commented:

When I'm watching videos at times. 'Cause I have to look down and I should be watching but I have to use it to check work.

It appeared that the need to check off the monitoring form whenever he watched classroom videos was distracting. This was because he had to look away momentarily from the video as he checked off the form. Except for that, he found that self-monitoring was mostly not distracting. Nico commented during the interview that he did not feel that self-monitoring was distracting at all.

Researcher: Do you find it distracting?

Nico: (inaudible)

Researcher: Not at all?

Nico: No.

For the most part, it was true that he did not let self-monitoring distract his performance in class. However, there were several moments during the intervention and maintenance sessions where Nico was more focused on the self-monitoring timer and form than he was focused on his tasks, and this affected the way he maintained his on-task behaviour.

Independence versus guidance. One of the words that often appeared in my field notes during my observation sessions is "independent". It refers to one's capability to be self-reliant, and not depend on external influences to perform and achieve goals. Aliya displayed independence in the way she carried herself and completed her class work. Although she needed direction at times, she did not require many prompts or reminders to carry out independent tasks.

Neither did she require much hand-holding in terms of learning to self-monitor. Aliya demonstrated that even with fewer cues from the self-monitoring timer, she was able to keep a check on herself and maintain on-task behaviours during the maintenance phase.

In contrast, Nico and Ethan demonstrated that they required more guidance in their learning. It was observed that when they received one-to-one guidance, they became more aware of what was expected from them and, as a result, they were more on-task in completing their class work. They needed more prompting and direction in identifying on-task and off-task behaviours, and they took a longer time to self-monitor independently. While Aliya took two sessions to successfully learn to self-monitor without guidance, Nico and Ethan took approximately three weeks due to their dependence on reminders, prompts, and direct instruction. Even after successfully self-monitoring for a couple of sessions, Ethan at times required prompts to begin monitoring himself for the day, and Nico needed to be reminded what on-task behaviour was. In addition, Ethan mentioned during the interview that he was able to be better focused in the presence and with the guidance of an adult or peer that he liked.

Ethan: I don't really…I only stay focused because I do it with my mom.

Researcher: Oh, you do it with your mom to stay focused. So, does it help that you have an adult with you, or with someone else that would help you stay focused?

Ethan: (nod) My sister as well.

Interestingly, Nico also mentioned in the interview that he preferred having his teacher help him focus.

Researchers: Do you have other ways to help you focus and stay on-task?

Nico: Listen to the teacher.

This supports the notion that they were less independent learners and would likely require more guidance and reminders to check themselves, in the long run, in order to sustain any positive self-monitoring effects.

Clear understanding of instructions. It was mentioned in the previous paragraph that when Nico and Ethan received one-to-one guidance, they became more aware of what was expected from them and, as a result, they were more on-task in completing their class work. This was particularly observed in Ethan. During the first session of the maintenance phase, Ethan was off-task at the beginning. He was prompted to seek clarification about his task from the teacher, and when he had a clear understanding of the teacher's instruction, he became on-task. Even when the teacher had walked away after explaining her instructions to him, he remained on-task. This happened in the second session as well, where he was reminded to ask for help whenever he did not know what he had to do. After he had approached the teacher for clarification, he was able to stay focused for the rest of the observation session.

Cognitive systems. By cognitive systems, I refer to participants' ability to process and make sense of their thinking and learning. It was observed that, in comparison to peers their age, Nico and Ethan appeared to have lower levels of cognitive systems. As one example, the following excerpt was taken during the interview with Nico:

Researcher: You do? Can you tell me which parts you like? What do you like about doing this (self-monitoring)?

Nico: When this thing beeps.

Researcher: You like it when it beeps in your pocket?

Nico: Yeah. And sometimes the batteries keep dying.

Researcher: Oh, you don't…

Nico: So I have to use yours.

Nico did not show total clarity in understanding what was being asked from the way he responded to some of the interview questions, and he needed guiding questions to help him process his thoughts and experiences. When completing class activities, Ethan could be seen needing more time processing instructions, planning the steps on which to embark, and completing the assignments.

Similarly, the immaturity in their cognitive system could also be seen in Nico and Ethan while teaching them the intervention. It took them a longer time to make sense of the self-monitoring intervention, and even when they understood, there were instances in which they were inconsistent in the way they checked themselves over the course of the training sessions. Conversely, Aliya displayed a relatively more developed cognitive processing. She was able to mentally process whatever she was taught almost at the same pace as her peers, and she was able to complete her tasks in about the same time as her peers. She was also able to multi-task well as she completes her work and self-monitoring.

Disinterest in activity. During observations, it was noted that participants' on-task behaviours were affected by their interest towards the tasks, or the activities. As described earlier, Ethan's on-task behaviour showed a sharp decrease during the fourth session as compared to the other sessions of the maintenance phase. There were no known changes or difference to his day or the classroom environment that day. However, it was observed that he was off-task while the rest of his classmates were watching a video, and sharing their thoughts

about the contents of the video in a sharing circle. His off-task behaviour was shown in the way he moved the tangram pieces to make different shapes as the video was being played, moving around his spot to fidget with pencils and spaghetti strands, and not participating in the activities. Ethan revealed that he did not like to participate in big group discussions. Except for this incident, the rest of the sessions during the maintenance phase reflected scores that were above the mean of on-task behaviours in that phase. From this observation, interest towards the task, activity, or subject may be a factor in maintaining self-monitoring effects.

Similarly, disinterest was also a reason for Nico's low score during the second session of the maintenance phase. As mentioned earlier, Nico was disinterested in a story-reading session. He was considered off-task because his eyes looked glazed, and he did not respond to the exciting part of the story nor was he able to respond to the teacher's questions about the story. It was also highlighted that during the third session of the maintenance phase, Nico showed disinterest in listening and writing, and was off-task during the writer's workshop. However, when the lesson transitioned to art, he became more on-task and motivated. Based on these observations, interest in a particular subject or task may encourage the maintenance of self-monitoring effects.

Chapter 5

Discussion

In this chapter, I provide interpretation to the research findings in relation to the research questions. Based on the discussion, implications for practice will be offered. I will also include some limitations to the study and suggest recommendations for future research.

The research findings suggest that self-monitoring intervention is a useful tool for improving the focus and on-task behaviour of students with different characteristics of ADHD, as shown in the improvement of participants' on-task behaviour scores after introducing the intervention. However, out of three participants, two participants were not able to maintain on-task behaviours over a longer period of time. Although the intervention had a positive impact on Ethan, he had a lower on-task behaviour score in the maintenance phase than in the intervention phase. Likewise, Nico's on-task behaviour score in the maintenance phase had almost returned to the baseline score. Similar to previous studies before this, on-task behaviour in maintenance phase either returned to baseline levels (Otero & Haut, 2016), or decreased from intervention phase (Mirnasab & Bonab, 2011) when the intervention was faded.

Of the three, one of the participants, Aliya, was able to maintain on-task behaviours. She was clinically diagnosed with ADHD, so she was deemed a suitable candidate for the study. The intervention had a small impact on her, given that she had displayed very low levels of inattentive behaviours at the beginning. As a result, it was easier for her to maintain on-task behaviours at the later stages. Other reasons that could have attributed to her ability to remain on-task are discussed below.

Given the results of this study and previous studies, while a few students are able to maintain intervention effects, it can be concluded that the majority of students experience more challenges sustaining intervention effects. Previous literature highlights student differences (Mirnasab & Bonab, 2011) and social influence (Holman & Baer, 1979) as reasons for the lack of sustainability of the intervention. Juxtaposing the observations, and interviews of Aliya with Nico and Ethan has allowed me to make comparisons and derive reasons for their ability to stay on-task or difficulty in remaining on-task. The reasons, (a) Distractibility and selective attention; (b) Independence versus guidance; (c) Clear understanding of instructions; (d) Cognitive system; and (e) Disinterest in activity, are further discussed:

Distractibility and selective attention. All three participants shared that they liked the intervention, because it enabled them to focus on the teacher and remain on-task. This positive attitude towards self-monitoring seemed to have resulted in an improvement in on-task behaviours from baseline to intervention phase. However, it was not substantial in determining if their positive responses towards self-monitoring is a reason for maintaining or not maintaining on-task behaviours.

Nevertheless, there was some insight in understanding the participants' responses in regard to the distractibility of the intervention. Given that both Nico and Ethan were distracted by the self-monitoring timer and form over several occasions, whereas Aliya remained minimally distracted, it can be suggested that Nico and Ethan appeared to experience a greater deficit in selective attention than Aliya. As explained by Reid and Johnson (2012), selective attention is one of the four types of attention that individuals contend with on a daily basis. Individuals with a deficit in selective attention will experience more difficulty blocking out distractions and sustaining focus on a particular task. For this reason, Aliya was able to maintain

self-monitoring effects while it was not as easy for Ethan and Nico to maintain effects. Ethan and Nico may require more help and exercises to strengthen their selective attention ability. Exercises, such as mediation, may work hand-in-hand with self-monitoring to sustain on-task behaviour.

Independence versus guidance. Based on the observations, it can be concluded that participants who had more of an independent character were able to check their on-task behaviours on their own, whereas those who were less independent needed more guidance and reminders to check their own behaviours to stay on-task. By fading self-monitoring in the maintenance phase, participants had to check their on-task behaviour over longer durations between each cue. In other words, within the same time span, participants were reminded fewer times to check themselves. Because less independent learners, like Nico and Ethan, require more guidance in their learning, they may need more reminders and more time to sufficiently internalise the self-monitoring intervention or develop a habit of monitoring themselves consistently with an internal cue. However, in this study, all the participants were moved into the maintenance phase twelve days after the end of the intervention phase. Therefore, Nico and Ethan might not have been ready to move into the maintenance phase. As a result, they may experience more difficulty checking themselves and consistently performing on-task behaviour.

Clear understanding of instructions. From two incidences demonstrated by Ethan, it is possible that a participant may display off-task behaviour because he/she is unsure about the expectations or requirements to carry out the task. It can be implied that participants who knew the expectations of their tasks or what they had to do to complete the tasks would have a higher propensity remaining focused on a task that was suitably pitched at their level. Knowing that participants could have performed better for a longer time if they knew what was expected of

them, begs the question, “What stopped them from seeking clarification?” Having a fear of looking stupid, social threat or being afraid of appearing uncool in front of peers, not knowing what to ask, and not knowing where to start, are some reasons that are mentioned in an article by Sparks (2014). In Ethan’s case, he had not realised that he could ask the teacher for clarification. He had to be taught that asking for help was an action that was perceived as being on-task and helping him to be on-task.

Cognitive system. Taking into account of the observations, it can be suggested that participants who possessed less mature cognitive systems were less likely to maintain self-monitoring effects. Cognitive load refers to the amount of mental effort that is invested in the working memory to perform a specific task (Seufert, 2018). When tasks become too demanding and exceed the participant’s ability to process thinking and learning, the participant experiences high cognitive load. Thus, when one experiences high cognitive load, it will be more difficult for him or her to pay attention to the task at hand, rehearse and remember, and to acquire schema (Sweller, 1988).

Depending on the task, the act of having to check themselves while attending to classroom instruction may at times be too demanding cognitively for Nico and Ethan. Their ability to focus on the task or monitor themselves became affected. As a result, this affected their ability to maintain on-task behaviours in the long run. This conclusion supports the work of Selikowitz (2009), who described that when tasks are too demanding for immature cognitive systems, it can be fatiguing for children with ADHD, and this results in a lack of persistence in the things that they do.

Disinterest in activity. It is not new that interest plays an important role in learning. Schiefele (1991) explains that interest towards a particular area is able to influence students’

decision in striving for high levels of performance or display intrinsic motivation in that area. This explains how students' interest in an activity increases their motivation to stay on-task, and conversely, how their disinterest reduces their incentive to stay on-task. Through the observations of Nico and Ethan, it can be said that disinterest in specific activities has led to a decrease in on-task behaviour scores. Having said this, disinterest in certain activities may signal an underlying reason for staying off-task. One such reason includes having a lack of knowledge and skills in handling the activities. For instance, when students do not know how to carry out a task, they may not know how to ask for help and they withdraw from their task. As a result, the withdrawal from the task may masquerade as disinterest in the task in the eyes of the teachers and peers.

Implications for practice

It is known that ADHD is a spectrum disorder, and as clearly seen in this study, not every person with ADHD experiences the same symptoms and challenges. Similarly, not every individual with ADHD has the same aptitude, brain development, experience, or coping mechanisms. Whether self-monitoring appeals to and works over a longer duration is dependent on the individual with ADHD. It is, therefore, necessary to understand the strengths and weaknesses of the individual and establish the suitability of the self-monitoring intervention. Understanding that the individual has a lower cognitive system or requires more guidance in learning to self-monitor, for instance, informs educators and practitioners that perhaps the individual requires more time, assistance, and strategies in gaining mastery and regulating their on-task behaviours before fading the intervention. In this study, the participants moved into the maintenance phase twelve days after the end of the intervention phase, regardless of their level of cognitive maturity. The lesson learnt is that participants who have shown that they need more

time should be given more time to regulate their behaviour monitoring before fading practices in the maintenance phase.

This study makes use of the interval timer as a reminder cue for students. Although Nico commented that he was not distracted by the timer, his attention in class was diverted towards the timer in several occasions. Even Aliya, who was not distracted by the timer, was momentarily distracted by the Chromebook. It is important for teachers to note that students' attention will inevitably be diverted when technology is used in the classroom. Understanding the extent of how distractible the individual is by the intervention timer itself allows educators and practitioners to determine whether the self-monitoring intervention is the best form of help for that individual or whether there are other strategies that can supplement this intervention. A strategy that can supplement the intervention for individuals struggling with distractibility of timer or selective attention deficits is to consider preventing high cognitive loads. This can be done by pitching the learning task at an appropriate level and using the intervention at an appropriate time, so that there is no competing stimuli that overwhelms the cognitive systems, and the individual can regulate their self-monitoring more successfully. Another strategy is to strengthen individuals' selective attention by practising meditation, a form of attention training. Once selective attention is strengthened, individuals will be able to block out distractions better and focus on self-monitoring and on their tasks.

It is important to note that self-monitoring is not a one-tool-fix-all intervention. Self-monitoring is an intervention that should be used in tandem with other strategies in order to help students achieve their goals. For a student who does not know what to do whenever he or she struggles with a task and becomes disinterested and off-task as a result of it, self-monitoring will not be able to serve its purpose. More often than not, we tend to assume that students will learn

to overcome their struggles on their own. Some do through trial and error, or by watching others in their struggles and learning from it. Others do not and are not able to make sense of their struggles on their own. For the latter, it is necessary to teach strategies to indicate that help is required, alongside the use of self-monitoring, so that they may have a higher propensity to remain on-task in spite of their struggles.

Among the participants, Nico was the least able to maintain on-task behaviours, given that his on-task scores were the lowest. However, it is necessary to take into account that Nico was in grade 4 while Ethan and Aliya were both in grade 7. This meant that having only approximately four years of formal education, Nico would have been taught fewer strategies to help him stay on-task as compared to Ethan and Aliya, who would have received more interventions to help them cope with inattention in their seven years of formal education. With this information, it would be acceptable to say that Nico's challenges in maintaining on-task may be attributed, in part, to fewer strategies received over the years in formal education.

Finally, in reference to Ethan's experience asking for clarification to maintain on-task behaviours, it should be noted that not every child naturally knows how to ask questions or ask for help. Asking for help is expected of them when they enter the class on the first day of school, but it is a skill that is rarely explicitly taught in the classroom or at home. The implication is teachers may need to go the extra mile for students with ADHD. In the case of Ethan, it may help Ethan if he had to verbalise the instructions that the teacher had given, so that the teacher could check for understanding of the instructions and expectations. Furthermore, for students like Ethan who are less independent, asking for classmates to volunteer to provide one-to-one guidance would be helpful.

Limitations and recommendations for future research

Several limitations can be drawn from this study. As mentioned in Chapter 3 of this thesis, having a small number of participants included in the study is a limitation. The small sample size implies that interpretation of results may be more subjective, less thorough, and may not be seen as representative to the wider population of students with ADHD. For instance, claiming that Nico and Ethan's disinterest in specific activities had resulted in a decrease in on-task behaviour can be construed as subjective interpretation, which could be given more credence if a greater number of participants demonstrated similar attributes. Furthermore, statistically, knowing that one out of three participants was able to sustain on-task behaviours longer does not provide a convincing generalisation that students with ADHD are able to sustain self-monitoring effects. For this reason, a bigger sample size for the analysis of the study is recommended for future studies.

Another limitation of the study has to do with the number of monitoring sessions that each participant was observed at every phase. In this study, participants were observed five sessions per phase. This was the same time frame for all the participants, disregarding the participant's abilities, and disposition. Although it is recommended that five data points per phase are acceptable (Kratochwill, 2013), the consequence is data collected at the intervention and maintenance phases may not reflect a stable trend of participants' behaviour. For instance, in Nico's case, by having more observation sessions at the maintenance phase or having a longer maintenance phase, I would have be able to ascertain with greater confidence if certain aspects, such as disinterest or seating arrangement, are reasons for the lack of maintenance. For this reason as well as the fact that the sample size is small, it is recommended that the number of

observations of self-monitoring sessions be increased in future research, so that more observations can be made to reinforce themes, and results can be strengthened.

It was mentioned that two questions were omitted from the interview. It would have been useful to find out what participants were experiencing during those specific moments when they were on or off-task. For future research, I recommend that researchers may include a debriefing after each session to have a better sense about the participants' experience. That way, there is a higher chance that participants could remember what had happened that day and provide more input to their experiences.

Even though an observation guide was used to help me decide if participants were on or off-task, there was still a hint of ambiguity especially in tasks that involved watching or listening. In both cases, it would be possible that participants appeared to be watching or listening, but in actual, they were not. It was challenging for me to confidently determine if they were on-task because their thinking processes were not accessible based on observation. To circumvent this, future researchers may include a research partner in carrying out observations. Having inter-observer agreement during the observation sessions allows observer bias to be reduced.

In carrying out the research, I was an external member of the school. The analysis of the results of the study was based on my knowledge of the participant at the point of recruitment. At that point, I had not seen the need to understand the kinds of support that the participants had received prior to the study or the participants' educational history. Having a deeper knowledge of the participants' support or educational history may provide me with a well-rounded context for a richer analysis. Future researchers may want to include a questionnaire to understand participants' educational background and the kinds of supports participants have received.

Stake (2010) stresses that generalisations from one case can be generalised to other cases. Hence, more research in relation to this study is needed to support or refute the results of the study. In this study, gender and ethnicity are not target characteristics to be studied. It was interesting to note that Aliya, being the female in the study, had more success in maintaining effects. Whether it was gender, cognitive maturity, age or family support, future research may explore the impact of such qualities on the maintenance of self-monitoring effects. In addition, from this study, it was noticed that Nico may have been more suited to use self-monitoring performance (SMP) intervention, instead of self-monitoring attention (SMA). Future researchers are encouraged to communicate with teachers on understanding whether the SMA or SMP should be applied to each participant before beginning the intervention phase. In doing so, they can study the outcomes of understanding the participants on the maintenance effects of self-monitoring.

Summary

The results of this study support literature specifying that a student's ability to stay focused and on-task can be improved with the help of the self-monitoring attention intervention. Therefore, educators and practitioners should strongly consider teaching students with ADHD the self-monitoring intervention. Early intervention as soon as there is a diagnosis will help students with ADHD manage their on-task behaviour. A school-based approach may be adopted to ensure that students with ADHD continue to self-monitor yearly until they have fully internalised the monitoring habit and are able to maintain on-task behaviours.

This study also extends previous research that points to the difficulties students with ADHD face in maintaining long term effects of self-monitoring. The ability to maintain effects is dependent on students. Hence, educators are encouraged to choose the type of self-monitoring

intervention after considering the student's qualities, strengths, weaknesses, and motivations. With proper tools and time spent on self-monitoring, it is possible for students with ADHD to become effective managers of their own behaviours.

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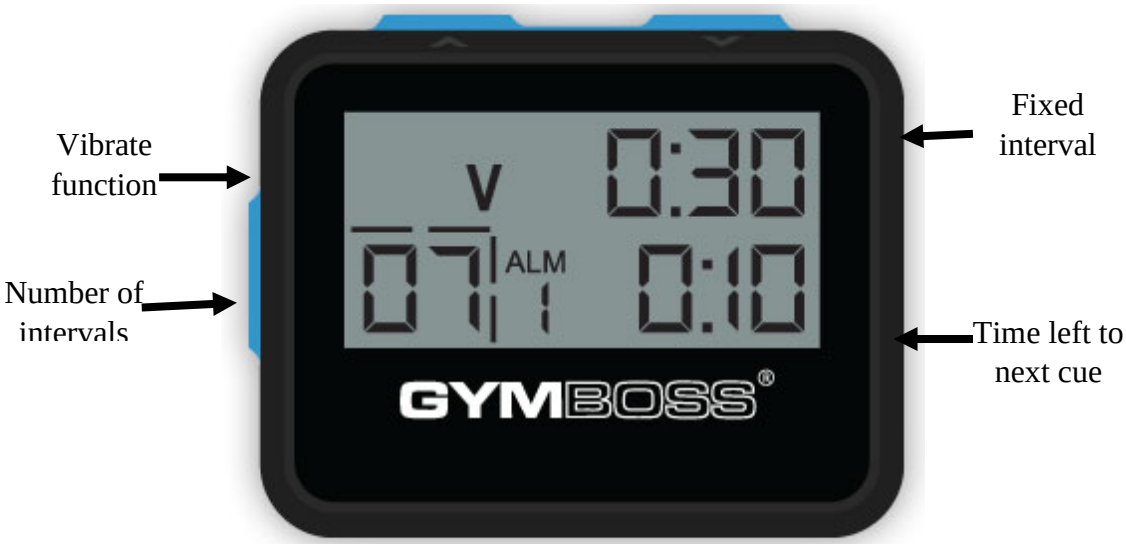
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Appendix A: Interval Timer



Appendix B: Self-monitoring forms

(Used during intervention phase)

Name: _____ Date: _____

Put a tick (✓) in the columns to answer this question.

Are you on-task?

Time interval	Yes I was on-task. ☺	No I was not on-task. ☹
2		
4		
6		
8		
10		
12		
14		
16		
18		
20		

(Used during maintenance phase)

Name: _____ Date: _____

Put a tick (✓) in the columns to answer this question.

Are you on-task?

Time interval	Yes I was on-task. ☺	No I was not on-task. ☹
4		
8		
12		
16		
20		

Appendix C: FOCUS Reminder Chart

F Focus on speaker	O Open your mind	C Connect	U Use your eyes	S Select
• Eyes and mind on the speaker. • Resist talking to your friends. • Keep hands and feet quiet.	• Clear your mind of distracting thoughts. • Be ready to learn and remember. • Set your mind on the subject. • Think about what is being said.	• Relate what you are hearing to things that you already know. • Create a picture about what you are hearing in your head.	• Look and pay attention to what you are supposed to be doing.	• Choose the important parts to pay attention to. • Choose to do the right thing.

Appendix D: Observation guide

Modified from Shapiro, E. S. (2011). Behavioural Observation of Students in Schools (BOSS). Academic Skills Problems. New York: The Guilford Press.

Possible on-task behaviour	• Looking at or making eye-contact with the speaker • Looking at self-monitoring form, board, or task • Reading silently or aloud at appropriate times • Listening to the speaker • Talking to the teacher or peers about task (unless talking is prohibited at that moment) • Responding to a request or question • Writing or working on the task, or self-monitoring form • Raising a hand to speak • Working on task with the use of the Internet or computer/devices (i.e. not distracted with other websites or games found on the device) • Working in groups effectively (i.e. talking about task, taking turns)
Possible off-task behaviour	• Requiring verbal prompts and reminders to remain on-task • Aimlessly looking around the classroom • Reading unassigned material • Talking out of turn • Calling out (unless it is considered an appropriate response style for that classroom) • Talking about things that are not relevant to the lesson, or task • Walking aimlessly around the classroom • Manipulating objects that are not related to task • Engaged or sitting quietly in an unassigned task • Aimless flipping of pages, or writing that is irrelevant to task

Appendix E: Interview Guide

Depending on the participant's responses, the following questions will be selectively used during the interview. Opening to the interview: "Thank you for agreeing to this interview. I would like to understand your experience with self-monitoring. Feel free to tell me what you think and feel about your experiences. Do you have any questions before we begin?"

3. Was self-monitoring easy to carry out? Which parts did you think were easy/difficult?
4. How did self-monitoring benefit you?
5. What do you dislike about the self-monitoring process?
6. What would you change about the self-monitoring process?
7. Do you think your on-task behaviour has increased, stayed the same, or decreased from the start to the end? Can you tell me why you were more/less on-task then? (Show graph of participant's on-task behaviour from baseline to intervention to maintenance phases) Look at your on-task behaviour at these points, do you agree with your earlier description? Why do you say so?
8. (If there were significant changes in participant's behaviour pattern) What has happened during this time that you monitored yourself?
9. Would you continue to self-monitor? Why or why not?
10. How long do you think you will continue to self-monitor? Why?
11. What conditions would you change so that you can continue to self-monitor?
12. What would motivate you to continue self-monitoring?
13. What would stop you from self-monitoring?
14. Do you prefer to use other methods, more than self-monitoring, in order to maintain on-task behaviour? What are the preferred methods? Why do you prefer them?

Appendix F: ENREB Approval

UNIVERSITY OF MANITOBA | Research Ethics and Compliance

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PROTOCOL APPROVAL

TO: **Chai Lin Grace Ong** **(Advisor: Zana Lutfiyya)**
Principal Investigator

FROM: **Todd Duhamel, Vice Chair**
Education/Nursing Research Ethics Board (ENREB)

Re: **Protocol #E2018:025 (HS21617)**
"Maintenance effects of self-monitoring intervention by students with Attention-deficit/Hyperactivity Disorder (ADHD)"

Effective: March 14, 2018 **Expiry:** March 14, 2019

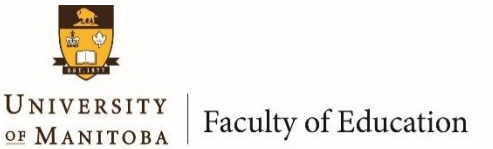
Education/Nursing Research Ethics Board (ENREB) has reviewed and approved the above research. ENREB is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans.*

This approval is subject to the following conditions:

1. Approval is granted only for the research and purposes described in the application.
2. Any modification to the research must be submitted to ENREB for approval before implementation.
3. Any deviations to the research or adverse events must be submitted to ENREB as soon as possible.
4. This approval is valid for one year only and a Renewal Request must be submitted and approved by the above expiry date.
5. A Study Closure form must be submitted to ENREB when the research is complete or terminated.
6. The University of Manitoba may request to review research documentation from this project to demonstrate compliance with this approved protocol and the University of Manitoba *Ethics of Research Involving Humans.*

Funded Protocols:
- **Please mail/e-mail a copy of this Approval, identifying the related UM Project Number, to the Research Grants Officer in ORS.**

Appendix G: Letter to school principal



Letter to the School Principal

Dear sir/madam,

Research: Maintenance of Self-Monitoring Attention Intervention for Students with Attention Deficit/Hyperactivity Disorder (ADHD)

I am a graduate student at the University of Manitoba. My thesis is on the maintenance effects of a self-monitoring attention intervention for students with ADHD. The intervention requires students to evaluate their attention and on-task behaviour at fixed cued intervals, then record the occurrence or non-occurrence of the target behaviour. This has helped increase students' on-task behaviours. Through this study, I want to determine if students with ADHD can maintain gains from the self-monitoring attention intervention, and to identify reasons for the presence or absence of maintenance. The research questions are as follows:

1. What are the maintenance effects of the self-monitoring attention intervention for students with ADHD?
2. What are the reasons for the positive or discouraging maintenance effects of the self-monitoring attention intervention?

I am writing to request for approval to conduct the study in your school for a period of 8 to 12 weeks. Three to five students with ADHD, between grades 4 to 8, will be recruited. Upon your approval, I will send a recruitment package to all students in grades 4 to 8. Parents whose children have ADHD and who consent to the conditions may contact me directly. I will verify students' suitability through a phone survey with the parents. Permission from the relevant teachers to carry out the study in their classrooms will be obtained. Letters are attached for your perusal.

To collect baseline data, participants' on-task behaviours prior to the intervention will be observed in their classes by me. There will be five 20-minute sessions. Participants will then be taught to self-monitor their on-task behaviours. I will contact parents directly to arrange a time and place for participants to learn to self-monitor. Once competent, they will self-monitor their behaviours in class during the intervention phase. There will be five 20-minute sessions in the intervention phase and

five 20-minute sessions in the maintenance phase. Observations about teachers and other students in the classroom will be excluded in the study. A voice recorded interview (30 – 60 min) with each participant will also be conducted. Parents will be contacted directly to arrange a time and place for the interview. Participants will not miss classroom time during the training sessions and interviews.

A device will be used. The device will be on vibration mode and will only be used to cue participants to monitor themselves. It will be placed in their pockets, so that it will not distract the other students.

All identities are confidential. Please do not disclose to others that the participants have ADHD, and they are participants of this study. Data collected will be stored in secured devices. My thesis advisor and I will have access to the raw data. The University of Manitoba may examine my research records to ensure that this study is conducted in a safe and proper way. All data collected will be deleted and shredded upon the completion of the study in May 2019. The study may be disseminated in presentations and publications. It will be available within two months after the study is completed.

Participation is voluntary, and participants may withdraw from the study without penalty. Through the study, students benefit from self-monitoring, which improves on-task behaviour, develops independence and can be used to improve their lives. There is minimal physical, or psychological risks. If participants feel distress, I ask that a school counsellor may be available to speak to them. Alternatively, they may contact Kids Help Phone (1-800-668-6868), a 24-hour counselling helpline.

This research is approved by the Superintendent of [redacted] School Division and the Education Nursing Research Ethics Board at the University of Manitoba. The Human Ethics Coordinator may be contacted at humanethics@umanitoba.ca or (204) 474-7122. If you need more information, please contact me at [redacted] or my thesis advisor, Dr Zana Lutfiyya, at [redacted].

Please email your written approval to [redacted]

Sincerely,

Grace Ong

Appendix H: Recruitment and information letter to parents or guardians



Recruitment and Information Letter

Dear parents/guardians,

Research: Maintenance of Self-Monitoring Attention Intervention for Students with Attention Deficit/Hyperactivity Disorder (ADHD)

I am a graduate student at the University of Manitoba. My thesis is on the maintenance effects of a self-monitoring attention intervention for students with ADHD. The intervention requires students to observe their behaviour at fixed intervals, and evaluate if they were on-task or off-task. This strategy has helped increase students' on-task behaviours. Through this study, I want to know if this strategy helps students with ADHD continue to be on-task over a period of time, and to identify reasons if they were able or not able to continue the on-task behaviour. The research questions are as follows:

1. What are the maintenance effects of the self-monitoring attention intervention for students with ADHD?
2. What are the reasons for the positive or discouraging maintenance effects of the self-monitoring attention intervention?

I will like to recruit students who have ADHD and are between grades 4 to 8 to be participants for this study. I am writing to seek your consent in letting your child participate in this study for an 8 to 12-week period.

<u>What you and your child need to do</u>

Before teaching your child to monitor him/herself, your child's on-task behaviours in the class will be observed by me for five 20-minute sessions. After that, your child will learn the self-monitoring strategy. I will contact you to arrange for a time and place for him/her to learn the strategy, which will likely take up 15 to 30 minutes. After learning to self-monitor, he/she will use the strategy for ten 20-minute sessions in class. Your child's on-task behaviour in class will be observed by me. I will provide feedback on your child's on-task behaviour at the end of the sessions.

Thereafter, your child will be interviewed (30 – 60 min) with a voice recorder. Parents will be contacted directly to arrange a time and place for the interview. Participants will not miss classroom time during the training sessions and interviews. After the interview, I will transcribe the oral conversation from the interview to a written transcript. The transcript will be emailed or delivered to you. You and your child have a week to check that the contents of the transcript is accurate and to sign off. If the transcript is not accurate, changes can be made.

What is needed

A device will be provided. The device will be on vibration mode and will only be used to remind your child to monitor him/herself. It will be placed in his/her pocket, so that it will not distract the other students.

Benefits and risks

Participants benefit from self-monitoring, which improves on-task behaviour, develops independence and can be used to improve their lives. There is minimal physical, or mental risks. The school principal and your child's teacher will be aware that your child has ADHD and is participating in this study. Your child's ADHD condition will not be disclosed to others. If your child feels distress, I will ask for a school counsellor to speak to him/her. Alternatively, he/she can call Kids Help Phone (1-800-668-6868), a 24-hour counselling helpline for children.

Consent

Once you agree to let your child take part in the study, I will also be asking him/her if he/she will like to take part in the study. As a token of my appreciation for participating in the study, participants will be receiving a $10 Staples® gift card. Participants can withdraw from the study at any point of the study without penalty.

General information

Participants' identities will not be revealed. All names will be replaced. Data collected will be stored in secured devices. Only my thesis advisor and I will have the confidential information. The University of Manitoba may examine my research records to see that my study is conducted in a safe and proper way. Data collected will be deleted and shredded when the research is completed in May 2019. The study may be shared in presentations and publications. It will be available within two months after the study is completed.

This research is approved by the superintendent of [redacted] School Division and the school principal. The research is also approved by the Education Nursing Research Ethics Board at the University of Manitoba. The Human Ethics Coordinator may be contacted at humanethics@umanitoba.ca or (204) 474-7122. If you would like more information, please contact me at [redacted] or my thesis advisor, Dr Zana Lutfiyya, at [redacted].

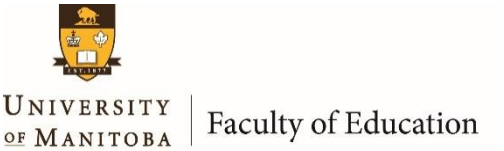
Your child's personal health information is being collected under the authority of The University of Manitoba Act. The information you provide will be used for this research. Your child's personal health information will not be used or disclosed for other purposes, unless permitted by The Personal Health Information Act (PHIA). If you have any questions about the collection of personal health information, contact the Access & Privacy Office at (204) 474-9462.

If you are interested in letting your child participant in this study, please email or call me. Thank you for your consideration.

Sincerely,

Grace Ong

Appendix I: Consent form



Research: Maintenance of Self-Monitoring Attention Intervention for Students with Attention Deficit/Hyperactivity Disorder (ADHD)

Researcher: Grace Ong
Contact [redacted]
Thesis Advisor: Dr Zana Lutfiyya
Contact: [redacted]

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what the participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully.

Purpose of this study: Determine if students with ADHD are able to maintain gains from the self-monitoring attention intervention, and to identify reasons for the presence or absence of maintenance.

I agree to let my child participate in the study titled *Maintenance of Self-Monitoring Attention Intervention for Students with Attention Deficit/ Hyperactivity Disorder (ADHD)*.

I understand that

- this study is conducted by Grace Ong, who is a graduate student at the University of Manitoba.
- the study will take 8 to 12 weeks.
- my child is required to learn how to self-monitor (15 – 30 minutes), use the self-monitoring intervention in class, and be involved in an interview (30 – 60 min), which will be voice recorded.
- my child's on-task behaviours in class will be observed by the researcher for at least fifteen 20-minute sessions.
- my child will not miss classroom time.
- the researcher and I will coordinate a convenient time and place to learn the self-monitoring process and to carry out the interview.
- my child and I have a week to check the transcripts for accuracy, and to communicate changes, if any.
- no one, apart from the school principal and my child's teacher, will be aware that my child has ADHD and is participating in this research.
- a session with school counsellor will be arranged if my child feels distress during the study.

- my child will decide if he/she wants to take part in the study, and he/she may withdraw from the study without penalty. Any data collected about my child will be destroyed and excluded from the study.
- my child will be receiving a $10 Staples® gift card for participating in the study.
- my child's identity will not be revealed.
- the confidential information will be available to the thesis advisor and the researcher, and the University of Manitoba will see that the study is conducted in a safe and proper manner.
- data collected will be deleted and shredded when the research is completed in May 2019.
- the study results, which will be shared in presentations and publications, will be available within two months of the completion of the study

The superintendent of [redacted] School Division and school principal have approved this research. This study has received approval from the Education Nursing Research Ethics Board at the University of Manitoba. The Human Ethics Coordinator may be contacted at humanethics@umanitoba.ca or (204) 474-7122.

Your signature on this form indicates that you have understood to your satisfaction the information regarding your child's participation in the study and you are agreeable to his/her participation. In no way does this waive your legal rights nor release the researcher, sponsor, or involved institutions from their legal and professional responsibilities. Your child is free to withdraw from the study at any time, and/or refrain from answering any questions he/she prefers to omit, without prejudice or consequence. The continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your child's participation.

_____ _____

Name of child Name of parent/guardian of child

_____ _____

Child's class Signature of parent/guardian and Date

Mobile: _____

Email: _____

Appendix J: Assent form



Research: Maintenance of Self-Monitoring Attention Intervention for Students with Attention Deficit/Hyperactivity Disorder (ADHD)

Researcher: Grace Ong

Why are you here?

This is a study about children who have low attention levels and are often off-task. The researcher wants to ask if you would like to be in this study. This form tells you about the study. If there is anything you do not understand, please ask your parents, your guardian or your teacher.

Why are they doing this study?

The researcher wants to see whether children, who have low attention levels and are often off-task, are able to continue attentive and on-task behaviours if they try to monitor themselves. She also wants to learn why some children can continue to be attentive and on-task while others cannot.

What will happen to you?

If you want to be in the study these things will happen:

1. The study will take up about 8-12 weeks. You will be taught how to monitor yourself with the help of a vibrating alert from a device, and record your behaviour on a form. You will carry out the monitoring for about 10 sessions in class. Each session will be about 20 minutes.
2. At the end of the 10 sessions, the researcher wants to learn about your experiences of monitoring yourself. You will take part in an interview to share your thoughts and experiences. The interview will be about 30 to 60 minutes long.

Will the study hurt?

No, the study will not hurt you. The researcher will teach you how to monitor yourself in class. You will not miss any lessons. The sessions will be carried out in class, so there are minimum disruptions to your participation in school. If you are feeling stressed and you need to talk to someone, you can tell the researcher or teacher and they will arrange for a school counsellor to talk to you. If you prefer, you can call Kids Help Phone. It is a helpline that listens to and helps children with their problems. The number is 1-800-668-6868.

What if you have any questions?

You can ask questions any time, now or later. You can talk to the researcher, your family, your guardian or your teacher.

Who will know what I did in the study?

Any information you give to the researcher will be kept private. Your name will not be on any study paper and no one but the researcher, your family/guardian, your teacher, and principal will know that it was you who was in the study.

Do you have to be in the study?

You do not have to be in the study. No one will be mad at you if you don't want to do this. If you don't want to be in this study, just say so. We will also ask your parents if they would like you to be in the study. Even if your parents want you to be in the study, you can still say no. Even if you say yes now, you can change your mind later. It's up to you.

Assent

I want to take part in this study. I know I can change my mind at any time.

_____ _____

Print name of child Class

_____ _____

Signature of Child Date

I confirm that I have explained the study to the participant to the extent compatible with the participants' understanding, and that the participant has agreed to be in the study.

_____ _____ _____

Printed name of Person obtaining assent | Signature of Person obtaining assent | Date

Appendix K: Email to obtain written permission from relevant teachers



Subject: Permission to carry out research in the teacher's class

Dear Sir/Madam,

Research: Maintenance of Self-Monitoring Attention Intervention for Students with Attention Deficit/Hyperactivity Disorder (ADHD)

I am a graduate student at the University of Manitoba. My thesis is on the maintenance effects of a self-monitoring attention intervention for students with ADHD. Self-monitoring attention intervention is a strategy that requires students to evaluate their attention and on-task behaviour at fixed cued intervals, then record the occurrence or non-occurrence of the target behaviour in a self-monitoring form. This strategy has helped increase students' on-task behaviours. Through this study, I want to determine if students with ADHD are able to maintain gains from the self-monitoring attention intervention over a long period of time, and to identify reasons for the presence or absence of maintenance. The research questions are as follows:

1. What are the maintenance effects of the self-monitoring attention intervention for students with ADHD?
2. What are the reasons for the positive or discouraging maintenance effects of the self-monitoring attention intervention?

Having obtained approvals from the Superintendent of [redacted] School Division, your school principal, and the participant's parents, I am writing to you to request for permission to conduct the study and observe (participant's name) in your class.

<u>What is the participant required to do?</u>

To collect baseline data, the participant's on-task behaviours prior to the intervention will be observed in the class by me. There will be five 20-minute sessions. The participant will then be taught to self-monitor his/her on-task behaviours. I will contact parents directly to arrange a time and place for the participant to learn to self-monitor. Once competent, he/she will self-monitor his/her behaviours in class during the intervention phase. There will be five 20-minute sessions in the intervention phase and five 20-minute sessions in the maintenance phase. Observations about teachers and other students in the classroom will be excluded in the study. A voice recorded

interview (30 – 60 min) with each participant will also be conducted. Parents will be contacted directly to arrange a time and place for the interview. The participant will not miss classroom time during the training sessions and interviews.

What instruments will be used?

A device will be used. The device will be on vibration mode and will only be used to cue the participant to monitor him/herself. It will be placed in his/her pockets, so that it will not distract the other students.

A FOCUS reminder chart will be used to direct the participant's focus. The chart will be enlarged and it has to be placed visibly in the class.

Roles of the teacher

To carry out the study, I need your support in the following ways:

- Attend a briefing/Q&A session to understand the intervention and requirements of the study.
- Share your weekly teaching schedule and allocate periods of the day for the participant to self-monitor and be observed by me.
- Let the participant self-monitor, even on days that I am not observing or collecting data.
- Look out for signs of stress from the participant and communicate it to me. I will request for a school counsellor to be available or direct him/her to the Kids Help Phone helpline.
- Maintain confidentiality; do not disclose that the participant has an ADHD condition, and that he/she is participating in the study to others.

This research is approved by the Education Nursing Research Ethics Board at the University of Manitoba. You may contact the Human Ethics Coordinator at humanethics@umanitoba.ca or (204) 474-7122. If you would like more information about the study, please contact me at [redacted] or my thesis advisor, Dr Zana Lutfiyya, at [redacted]. Please email your written permission to [redacted].

Sincerely,

Grace Ong

Appendix L: Phone survey

PI: Thank you for your interest and for responding to the research recruitment. Before accepting your child as a participant to this study, I would like to carry out a quick survey over the phone.

1. How would you describe your child's ability to stay focused and be on-task?
2. Is your child diagnosed with ADHD?
3. If yes to question 2, does your child's teacher or principal know that your child has ADHD?
4. If no to question 3, your child's principal and teacher will know that your child is participating in the study and has ADHD, are you okay with that?

PI: Once again, thank you for taking the time to complete the survey. I think your child is suitable for this study. Do you have any questions regarding the study? If you have read the consent form and agree to the contents, please sign the consent form and send it to me.

Or

PI: Once again, thank you for taking the time to complete the survey. Unfortunately, I am recruiting students who have ADHD, and I am not able to have your child as a participant.