

# **Behavioral Factors Influencing Attention-Deficit/Hyperactivity Disorder: A Study of Fourth Grade Behaviors**

**An Honors Thesis**

**By**

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## **Abstract**

“Let me see if Philip can Be a little gentleman Let me see, if he is able to sit still for once at table; thus Papa bade Phil behave; And Mamma look’d very grave. But fidgety Phil, He won’t sit still, He wriggles and giggles, and then, I declare swings backwards and forwards and tilts up his chair. (Hoffman)” This excerpt from Dr. Heinrich Hoffman’s poem, “The Story of Fidgety Philip,” written in 1845 is the first known description of a child with Attention-deficit/hyperactivity disorder. Since 1845, Attention-deficit/hyperactivity disorder, or ADHD, has become one of the most common disorders among children. ADHD can be treated using medication, various forms of therapies, or a combination of medications and therapies. The purpose of this research paper, including an extensive review of literature, is to explore the relationship between behavioral impacts on ADHD-like symptoms. By doing this, different types of behavior therapy could be explored as an option to treat ADHD without using medication.

A study was conducted with students and their parents regarding behavioral impacts on ADHD-like symptoms. The purpose of this study, which involved twenty students and twenty parents, was to discover whether a student’s behaviors at home affected the student’s behaviors at school. The survey used in the study was designed to analyze whether there was a relationship between the student’s ADHD-like symptoms and the student’s behaviors at home. This study focused on sleep habits, caffeine habits, television and movie habits, computer habits, iPod or other music device habits, videogame habits, and physical activity habits as well as symptoms linked to ADHD. The results of this study were inconclusive; however, the study provides a launching point for further studies that could possibly show a more detailed relationship between behavior and ADHD-like symptoms.

## Chapter 1: Introduction

Imagine spending a typical day in a crowded museum. The day would most likely include walking slowly around the different exhibits, following the herd of people from attraction to attraction. Museums are quiet and security guards constantly peruse through the displays holding their fingers to their lips while muttering shush. To a child with Attention-deficit/hyperactivity disorder (ADHD), an ordinary day at a museum could turn into a rollercoaster ride of symptoms such as flitting or running about, or blurting loudly in a place where order and quiet are expected. Children who suffer from ADHD tend to be constantly on the go—literally, and figuratively. A child with ADHD plopped in a museum for a day would likely want to move from piece to piece without standing in a line or waiting his or her turn to get a good look at the art. A child with ADHD might have a difficult time staying focused on the task at hand, in this example the task being exploring the museum. Children with ADHD have difficulty focusing because imaginary forces pull them in every direction at the same time. In addition to this disorganization and impulsivity, children with ADHD sometimes feel as though everything is happening in turbo speed and all instantaneously. As a result, feelings of panic can take over causing the child with ADHD to go wild—either by yelling inconsiderate things or by physically going wild in his or her actions such as climbing up a wall. Children with ADHD also struggle with focusing when it is completely silent. In order to focus best, most children with ADHD must be constantly in motion, whether it be tap dancing their feet underneath a desk while writing an essay, or listening to music while learning the current week's spelling list.

In today's world, the topic of ADHD has become a buzz word—especially when elementary school-aged children are being discussed. In a classroom of either twenty-five or thirty students, it is now likely that at least one student will be diagnosed with ADHD (National

Institute of Mental Health). Ten years ago, many people believed that ADHD was a made-up disorder used as an excuse for both children and adults who struggled to pay attention. Due to the fact that ADHD has become more common in classrooms, research on this topic has become more prevalent. The following review of literature reports some of this research and the influences it has had on teachers and their classrooms. The review also includes several factors that could possibly influence the disorder itself such as medications, treatments, media, and behavioral factors.

### **The Study**

In this thesis, a study was conducted to explore if ADHD is influenced by exposure to media and other behavioral factors such as sleep patterns and physical activity. In order to do this research, students in two fourth grade classes at the same elementary school in Helena, Montana were asked to complete student surveys concerning ADHD symptoms. After gaining permission from Bruce Messinger, the superintendent of the Helena School District at the time, the principal of the school, the fourth grade teachers, the parents, and the students, thirty-six students were asked to participate in this research. As a result, the parents of the corresponding students were asked to complete a parent survey on their child's behaviors and exposure to media at home. Participants were weeded out based on the return of permission slips. Twenty-one students and twenty parents participated in this research. Due to the fact that only student surveys that had an accompanying parent survey could be considered for this study, only twenty participants were included in the final research. The student surveys were administered in the classroom while the parent surveys were conducted over the phone. Parent phone numbers were provided by the parents as part of the permission slip their child returned to the school. The distribution of the student surveys took place on October 6, 2011 and October 7, 2011 at 9:15

a.m. and 10:30 a.m. respectively. The distribution of the parent surveys took place from October 10, 2011 to October 20, 2011 at varying times between 10:00 a.m. and 8:00 p.m. based on parent request which was submitted as part of the parent permission slip.

The results of the questionnaires showed some relationship between ADHD symptoms and behavioral influences and exposure to media. More importantly, this survey may have made teachers, parents, and students involved in this research consider the impact of their behaviors and possibly reevaluate how spare time is spent at home or in the classroom.

Based on the museum scenario above, ADHD makes life more difficult for children who are forced to cope with it on a daily basis. This study was conducted in order to explore a possible relationship between ADHD-like symptoms and exposure to media and other behavioral factors so that children with the disorder might find more success in schools, at home, and in other social settings.

### **Summary**

This thesis contains a review of literature focused on ADHD symptoms and treatments, as well as a study conducted in Helena, Montana with students and parents who agreed to complete surveys about ADHD symptoms and student behaviors and exposure to media.



## **Chapter 2: Review of Literature**

According to Centers for Disease Control and Prevention, Attention-deficit/hyperactivity disorder (ADHD) is one of the most common disorders in children. As of 2007, approximately 5.4 million children between the ages of four and seventeen had been diagnosed with ADHD (Centers for Disease Control and Prevention). Children with ADHD often have trouble staying on task whether it be at home or in a school setting. As opposed to children without ADHD, who from time to time are likely to have trouble focusing, children with ADHD have symptoms lasting into adulthood. Although ADHD is not curable, it is treatable. The types of treatment processes vary. Following is a more thorough explanation of ADHD as well as research on different types of medications and treatments used to control the disorder, and the effects of media and other behavioral factors on the disorder.

### **Attention-deficit/hyperactivity disorder (ADHD)**

ADHD was first described in 1845 by Dr. Heinrich Hoffman, a doctor of medicine and psychiatry (Barkley). Hoffman, who later became a poet, wrote a short poem about a young boy who possessed many symptoms of ADHD. This poem is called, “The story of Fidgety Philip” (Barkley). No scientific exploration was completed on ADHD until 1902 when Sir George F. Still gave a series of lectures at the Royal College of Physicians in England about children with specific impulsive and other behavioral problems likely caused by a combination of some genetic dysfunction and poor child rearing (Barkley).

There is no single set definition of Attention-deficit/hyperactivity disorder; most definitions are a brief overview of the disorder followed by placing more focus on describing the symptoms associated with the disorder. The National Institute of Mental Health describes ADHD as a condition that becomes apparent in some children during their early school years.

This disorder makes it difficult for children to control their behavior and/or pay attention (National Institute of Mental Health). The National Institute of Neurological Disorders and Stroke, which is a sub-source connected to The National Institute of Mental Health, describes ADHD as “a neurobehavioral disorder that affects 3-5 percent of all American children. It interferes with a person's ability to stay on a task and to exercise age-appropriate inhibition (cognitive alone or both cognitive and behavioral)” (National Institute of Neurological Disorders and Stroke). According to The National Association of Parents with Children in Special Education, ADHD is a condition that can make it difficult for a person to sit still, control behavior, and pay attention. Children with these issues usually experience the symptoms before age seven (National Association of Parents with Children in Special Education). Russell A. Barkley, a research professor of psychiatry, describes ADHD as “the current diagnostic label for children presenting with significant problems with attention, and typically with impulsiveness and excessive activity as well” (Barkley). Dr. Edward M. Hallowell offers a more personal description of ADHD in the preface to his book, Driven to Distraction when he quotes one of his teachers. He quotes:

There are some children who chronically daydream. They are often very bright, but they have trouble attending to any one topic for very long. They are full of energy and have trouble staying put. They can be quite impulsive in saying or doing whatever comes to mind, and they find distractions impossible to resist (Hallowell and Ratey).

Although varying sources describe ADHD in different phrasing and vocabulary, the exact definition of ADHD has not been agreed upon because not enough information is known about the causes of ADHD or the effects it has on those diagnosed with the disorder.

In addition to describing ADHD, these same sources also discuss three different types of ADHD. These types are: predominantly hyperactive-impulsive, predominantly inattentive, and combined (National Institute of Mental Health; and Centers for Disease Control and Prevention). Predominantly hyperactive-impulsive type ADHD occurs when a child diagnosed with ADHD does not exhibit signs of inattention frequently. Predominantly inattentive type ADHD means that the child diagnosed will not show significant symptoms of hyperactivity or impulsivity. Combined type ADHD occurs when a child possesses symptoms of hyperactivity, impulsivity, and inattentiveness.

Most sources use the principle characteristics, or symptoms, of Attention-deficit/hyperactivity disorder in order to describe the disorder rather than applying a long, medically drenched definition. The principal characteristics of ADHD are: inattention, hyperactivity, and impulsivity (National Institute of Mental Health). There are many symptoms associated with ADHD. According to the Mayo Clinic website page about ADHD, these symptoms include:

- Fails to pay close attention to minor details or makes careless mistakes in school work or other activities
- Has trouble sustaining attention during tasks or play
- Seems not to listen even when spoken to directly
- Has difficulty following through on directions
- Has problems organizing tasks or activities
- Fidgets or squirms frequently
- Runs or climbs excessively when it is inappropriate

- Blurts out answers to questions before they have been completely asked (Mayo Clinic)

At first glance, these symptoms seem applicable to all children. In order to be diagnosed with ADHD, these symptoms must occur frequently or constantly. Usually if symptoms last more than six months and occur in several settings, such as in the home and in the school, there is a chance that a child has ADHD. Only trained specialists and doctors are able to diagnose a child with ADHD; if there is any curiosity as to whether or not a child has ADHD, the best option is to schedule a medical evaluation for the child (Mayo Clinic). According to the National Institute of Mental Health, the symptoms of ADHD are:

- Becomes easily distracted by irrelevant sights and sounds
- Fails to pay attention to details and makes careless mistakes
- Rarely follows directions
- Blurts out answers to questions before they have been completely asked
- Feels restless and often squirms or fidgets
- Runs or climbs in situations where the behavior is inappropriate (National Institute of Mental Health)

When compared to the symptoms described by the Mayo Clinic, the symptoms of ADHD as listed by the National Institute of Mental Health are very similar—some symptoms are even worded exactly alike. According to the National Institute of Neurological Disorders and Stroke, ADHD involves: “failure to listen to instructions, inability to organize oneself and school work, fidgeting with hands and feet, talking too much, leaving projects, chores and homework unfinished, and having trouble paying attention to and responding to details” (National Institute

of Neurological Disorders and Stroke). Again, these symptoms are directly aligned with the symptoms described in the other sources.

The symptoms described above seem as though they are describing most preschool-aged children. In order to be diagnosed with ADHD several stipulations must apply. The child in question must show signs of the symptoms before age seven and the symptoms must be present for more than six months (National Institute of Mental Health). Another key thing to remember is that in order to be diagnosed with ADHD, the behaviors created by the disorder must act as a handicap in at least two areas of the child's life (National Institute of Mental Health). For example, if a child has difficulty paying attention in school and also struggles to maintain positive social interactions with peers or family members, that child could be a candidate for ADHD. If the child in question has problems linked with the normal ADHD symptoms and also shows signs of trouble in the classroom but does not show signs of distress in other areas of his or her life such as at home, on the playground, in other social settings, or in the community, the child will not receive a diagnosis for ADHD. If parents suspect that their child may have ADHD, it is important for them to first contact their pediatrician or a child psychologist or psychiatrist to have their child tested. If teachers are the first to ponder the possibility of a child in their class having ADHD, the teacher ought to mention his or her concerns first to the parents of the child then to school psychologist in order to have another opinion about the child's possible disorder. There are several professionals that are able to diagnose a child with ADHD. These professionals include: child psychiatrists and psychologists, developmental/behavioral pediatricians, and behavioral neurologists. Out of these professionals, psychiatrists, pediatricians and neurologists are able to prescribe medications; psychiatrists and psychologists can offer counseling or training to help the person diagnosed with ADHD cope with the symptoms

associated with the disorder (National Institute of Mental Health). When health professionals diagnose a child with ADHD, they often note any significant events in the child's life that might have sparked ADHD symptoms to occur. For example, the death of a family member or pet, depression, anxiety, or learning disabilities may cause a child to have ADHD-like behaviors. The next step in diagnosing a child with ADHD is to observe the child in various settings. By observing how the child behaves in several settings, the health professional will be able to compare the child's behaviors to the behaviors listed on an ADHD behavior rating scale (National Institute of Mental Health). Most health professionals use the American Psychiatric Association's Diagnostic and Statistical Manual-IV Text Revision (DSM-IV-TR) in order to help diagnose ADHD (Association). After a thorough examination of the child's behavior, the health professional will determine if the child ought to be diagnosed with ADHD.

In addition to noting significant events in a child's life, health professionals also consider other possible factors that could spark ADHD-like symptoms. ADHD tends to run in families so it is likely there is a hereditary aspect associated with the disorder. Brain research has shown differences between the brains of children diagnosed with ADHD and those without ADHD. Based on brain scans, the brains of children with ADHD have less activity in the portion of their brains that controls activity levels and attention. Children with ADHD lack a certain chemical present in the brain known as a neurotransmitter (National Association of Parents with Children in Special Education). Neurotransmitters help control behavior by sending signals from nerve cells to muscle cells. ADHD-like symptoms might also be influenced by exposure to second-hand smoke, other environmental toxins, and food additives (Mayo Clinic). The National Institute of Mental Health agrees with the Mayo Clinic but also lists exposure to lead, brain injury, and excessive sugar intake as possible factors linked to ADHD-like symptoms. The

possible influences of television, videogames, or other media sources such as iPods were not mentioned by the Mayo Clinic, The National Institute of Mental Health, or The National Institute of Neurological Disorders and Stroke, nor were the possible influences of sleep deprivation.

According to the National Institute of Mental Health, the National Institute of Neurological Disorders and Stroke as well as the Mayo Clinic and Centers for Disease Control and Prevention, there is no known cure for ADHD but it can be managed with a combination of treatments and medications. The most common types of medications for ADHD are stimulant drugs which balance brain activities. There are a variety of treatment options available to children and families affected by ADHD. These include but are not limited to: behavior therapy, psychotherapy, parenting skills training, family therapy, social skills training, and support groups (Mayo Clinic). These medications and treatments are addressed in more depth in the section of this chapter titled Medications and Treatments.

The important thing to remember about ADHD is that it varies from child to child. In order to get the best results for an individual an individualistic approach must be used in creating a treatment plan.

### **Attention-deficit/hyperactivity disorder Summary**

For the purpose of this study, a combined definition was put together based on information from the various sources mentioned in the explanation above. Information that overlapped from source to source was used to construct a well-rounded definition of Attention deficit/hyperactivity disorder. For the purpose of this study, ADHD is defined as a neurobehavioral disorder that affects children in their early school years and causes these children to have symptoms including but not limited to: failing to pay close attention to detail and making careless mistakes, becoming easily distracted by irrelevant sights and sounds,

blurting out answers to questions before they have been completely asked, squirming or fidgeting, and running or climbing in situations where the behavior is inappropriate. When ADHD is discussed throughout the research portion of this study it is noted that in order for a child to be diagnosed with ADHD the child must show signs of these symptoms for more than six months and that the symptoms must be present in at least two arenas of the child's life. This study does not attempt to diagnose any child with ADHD—it only explores a possible relationship between ADHD-like symptoms and influences of media and behavior.

### **Medications and Treatments**

As mentioned in the previous section of Chapter 2, there is no known cure for ADHD. Most people diagnosed with ADHD treat the disorder through treatment plans that usually involve some sort of medication and therapy. In this section, the types of medications available to treat ADHD are discussed. Common therapies that lessen symptoms of ADHD will also be addressed.

Several studies have been conducted by the National Institute of Mental Health in order to determine which treatment combinations effectively treat ADHD. The most common study done by the National Institute of Mental Health is known as The Multimodal Treatment Study of Children With Attention Deficit Hyperactivity Disorder which was last updated in March of 2008 (The Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder Study). This study included 579 children diagnosed with ADHD. These boys and girls were spread out in six different testing sites and were randomly assigned to one of four treatment combinations. These treatment types were: medication only, behavioral treatment only, a combination of medication and behavioral treatment, and routine community care. Students placed in the medication-only group and the combination group were routinely seen by



physicians who had contact with the child's parents and teachers. Students placed in the behavioral treatment group had routine appointments with a behavioral therapist and focused their treatment on academic, social, and sports skills. The behavioral therapists involved in this study often communicated with the child's parents and teachers. Children in the combination group also received help from a behavioral therapist. Children placed in the community care group were treated for ADHD by visiting with a doctor of their parent's choice once or twice during the study. The doctors involved in this section of the study had no contact with the child's teacher (The Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder Study). The results of the Multimodal Treatment Study of Children With Attention Deficit Hyperactivity Disorder were as follows: the children who received long-term combination treatments and the medication-management treatment alone were superior to the children who received behavioral treatment and community care. This study found that the combined treatment of medication and behavioral treatment allowed children to use lower dosages of medication when compared to the medication only group. Children in the combination treatment also performed better when tested in anxiety, academic performance, parent-child relations, and social skills (The Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder Study).

The National Institute of Mental Health has also sponsored another study known as the Preschool ADHD Treatment Study (PATs). This study tests the effectiveness and safety of a stimulant, methylphenidate, for children in preschool (National Institute of Mental Health).

According to a manuscript titled, "Medication and School Interventions for Elementary Students with Attention Deficit Hyperactivity Disorder," published in 2004 in *The International Journal of Special Education*, several million children are being treated with Central Nervous

Stimulation (CNS) stimulant medications due to symptoms of ADHD. The most common CNS medications include: Ritalin (methylphenidate), Dexedrine (dextroamphetamine), Adderall (amphetamine) and Cylert (pemoline) (Morisoli and McLaughlin). Concerta, Daytrana, and Dextrostat are other types of stimulant medications used to treat ADHD (Mayo Clinic). “Most children who receive stimulants show improvement in their attention, impulse control, task-irrelevant activity, academic productivity and accuracy, handwriting, play, social conduct, and ability to follow rules” (Morisoli and McLaughlin). Stimulant drugs work by balancing and boosting levels of brain chemicals known as neurotransmitters that control behavior by sending signals from nerve cells to other cells such as muscle cells (Mayo Clinic). According to Centers for Disease Control and Prevention, between 70 and 80 percent of kids respond positively to stimulant medications (Centers for Disease Control and Prevention).

The drug known as Ritalin is the most common type of stimulant ADHD medication. Ritalin has been used to treat ADHD symptoms since 1956 (Morisoli and McLaughlin). Ritalin works to decrease impulsivity, motor activity and disruptive behavior (Morisoli and McLaughlin). Dexedrine is the oldest type of stimulant drug used to treat ADHD. It has been used to treat the disorder since 1937 (Morisoli and McLaughlin). Dexedrine is not used as often as Ritalin but works to hinder the same behaviors as Ritalin. Adderall is the newest type of stimulant drug used to treat symptoms of ADHD. This drug is approved for children as well as adults with ADHD and is common among college-aged students diagnosed with ADHD. Adderall works to balance chemicals in the brain that control ability to focus on tasks and also decreases impulsivity and hyperactivity (Morisoli and McLaughlin). All of the above mentioned medications are approved by the Food and Drug Administration.

In addition to stimulant drugs such as Ritalin, nonstimulant drugs can also be used to treat ADHD and are often used when stimulant drugs create unbearable side-effects. Nonstimulant drugs work by inhibiting parts of the body so that the drug will control the body's ability to pay attention and to decrease hyperactivity. According to the Mayo Clinic, Atomoxetine is the most common nonstimulant drug used to treat ADHD. Atomoxetine, also known as Strattera, works to increase the ability to pay attention and decrease hyperactivity as well as impulsivity (National Institute of Health).

As with all types of medications, the medications that help alleviate symptoms of ADHD are associated with problematic issues. The side-effects of both the stimulant and nonstimulant medications include but are not limited to: decreased appetite, weight loss, sleeping problems, irritability, heart defects, twitching, liver problems, increased suicidal thinking, nausea, and sedation (National Institute of Health/Mayo Clinic/ Centers for Disease Control and Prevention).

The warning labels on ADHD medications have been also been modified by the Food and Drug Administration. The labels on ADHD medications have recently added warnings for sudden death, serious cardiovascular events, and suicidal ideation (Obringer and Coffey). According to this article, ADHD is also linked with traumatic brain injury and cerebral palsy. In 2006, the Food and Drug Administration concluded that all amphetamines used to treat ADHD must have a warning for sudden death or cardiovascular disorders on their labels (Obringer and Coffey). Of the above mentioned drugs, Adderall, Concerta, Dexedrine, Ritalin, Straterra, and Cylert all have blackbox warnings for risk of dependence or substance abuse (Obringer and Coffey). Safety is vital when using these medications and it is imperative that medications are administered and stored safely in order to eliminate the chance of substance abuse.

As the Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder stated, it is likely that the most effective types of treatment of ADHD result from a combination of medications and an additional therapy (The Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder Study). In addition to the medications mentioned above, there are also several types of therapies that can be used to treat ADHD. Psychotherapy, behavior therapy, parenting skills training, family therapy, social skills training, and support groups are examples.

Psychotherapy is the ADHD treatment that encompasses the other types of non-medication therapies. Psychotherapy focuses on six different problems children with ADHD experience. These problems are: 1. stress and anxiety; 2. low self-esteem; 3. feelings of incompetence; 4. grief over lack of accomplishments; 5. feelings of helplessness; and 6. poor social skills. By developing skills that allow the child to cope with these feelings, the problems associated with ADHD will be alleviated (Kane). Psychotherapy can also help develop other skills such as organizational skills, time management skills, and communication skills.

Behavior therapy is a type of therapy that could be used with all children, not just with children diagnosed with ADHD. Behavior therapy focuses on setting routines for the child as well as developing organizational skills. According to an article published in *Psychology in the Schools*, titled, "Efficacy of Cognitive-Behavioral Therapy in the Treatment of Children with ADHD, With and Without Aggressiveness," the problem children with hyperactivity possess stem from a deficiency in the ability to plan and think systematically (Miranda and Presentacion). Behavior therapy specifically targets these behaviors until the child with ADHD has better organizational and planning skills. In behavior therapy, children are taught problem-solving, self-instruction, self-reinforcement, and reinforcement for carrying out household tasks

(Miranda and Presentacion). This type of therapy also allows children with ADHD to explore their own feelings about their disorder so that they can trace behavior patterns and learn to control their behaviors. Behavior therapy works best when children are able to monitor their own behaviors and change undesired behaviors into desired and acceptable behaviors such as organizing schoolwork (National Institute of Mental Health). Behavior therapy will be most effective if teachers and parents help the child with ADHD by giving feedback, whether it be positive or negative, and by making set routines for the child to follow. Centers for Disease Control and Prevention lists the following components of behavior therapy: create a routine, follow the same schedule every day, get organized, avoid distraction, limit choices to avoid overstimulation, change interactions with the child, use goals and rewards, discipline effectively, and help the child find success (Centers for Disease Control and Prevention).

Parenting skills training could be a benefit to parents of all children, but it is especially useful to parents of children diagnosed with ADHD. In this type of training, parents are taught ways to observe their children's behaviors and change the unwanted behaviors into more functional behaviors. In parent skills training, parents are taught ways to teach their own children different skills such as organization and problem-solving. Parents can be taught skills such as waiting five seconds for a response after giving a command to their child, and giving warnings before giving a child time-out. (Danforth). Parent skills training focuses on positive and negative reinforcement, punishment, and giving immediate consequences (Danforth). The National Institute of Mental Health also states that parent skills training should teach parents how to use rewards and punishments in order to change their child's behavior to a desired behavior (National Institute of Mental Health). Classroom teachers also learn the importance of giving children positive, immediate feedback when the child exhibits a desired behavior and ignoring or

redirecting behaviors that are undesired (National Institute of Mental Health). Parent skills training is usually conducted by a trained therapist. Children and Adults with Attention-deficit/hyperactivity disorder or CHADD is an organization that offers support to both children and adults struggling with ADHD. CHADD offers a similar type of skills training that is called parent-to-parent training. This program was created by parents of children with ADHD and aims to educate new parents about ADHD (Children and Adults with Attention-Deficit/Hyperactivity Disorder).

Family therapy is another type of psychotherapy that does not directly address ADHD but more so is a type of therapy that teaches managing the stress that comes along with living with someone with ADHD (Mayo Clinic). Family therapy works in similar ways as parent skills training. In family therapy, all members of the family are taught ways to encourage desired behavior and dismiss undesired behaviors of the child with ADHD (National Institute of Mental Health).

Social skills training is yet another type of psychotherapy that could benefit all children, not just those diagnosed with ADHD. In fact, most elementary schools use social skills training in their classrooms. Social skills training teaches children how to behave properly in social situations. The elementary schools in Helena, Montana, have specialized teachers who visits classes on a regular basis in order to teach children the importance of demonstrating proper social skills. This specialist conducts a variety of activities with the students in the classrooms such as showing the children a picture of another child and asking them to determine how the child in the picture is feeling. By doing this, the children in the classroom learn to understand how others are feeling and are able to practice interacting with their classmates. Throughout this program, students also use role-playing in order to practice coping with feelings and stress.

According to both the Mayo Clinic and Centers for Disease Control and Prevention as well as the National Institute of Health's Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder, the most effective way to treat ADHD is through a combination of medication and therapy (Mayo Clinic/ Centers for Disease Control and Prevention/ The Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder Study). Each child is different and it is important to remember that the treatment process that works best for a specific child might be different than the treatment process that works best for another child with ADHD.

### **Medications and Treatments Summary**

There is no known cure for attention-deficit/hyperactivity disorder. Most studies suggest that the best treatment for the disorder is a combination of medications and therapies. The main types of medications for ADHD are stimulant drugs such as Ritalin, Adderall, and Concerta and nonstimulant drugs such as Atomoxetine. It is best to use caution when using these medications, just as the use of any medications must be monitored closely to avoid substance abuse. The main types of therapies associated with ADHD are psychotherapy, behavior therapy, parent skills training, family therapy, and social skills training. The purpose of this study is to examine more intensely the effects of behaviors, or the behavior therapy treatment, on ADHD.

### **Environmental and Behavioral Factors influencing ADHD**

Imagine trying to read a newspaper article while sitting in a room with fifty other people who are all talking at the same time. Reading a newspaper article in these conditions would not be an easy feat to accomplish. Now imagine trying to read a newspaper article while sitting at a table in a kitchen in complete silence. This task would be much easier to complete. Part of ADHD could likely be overstimulation, an environmental and behavioral factor. A child exists

in a plethora of environments. These include but are not limited to: a home environment, a school environment, an afterschool environment, and all the environments in between. In each environment, the child is treated differently and is exposed to different things such as television, videogames, and physical activity. Other environmental factors include but are not limited to the child: receiving a lot of affection from parents; being treated with patience; having a regular schedule for meals, naps, and bedtime; having a well-balanced diet; being well-rested; being effectively disciplined; having high self-esteem; and having highly developed organizational skills (Mayo Clinic). The type of environment a child is exposed to is related to the child's parents, siblings, and teachers. The parent skills training and social skills training mentioned above could help create a less-stimulating environment for a child with ADHD.

Many behavioral issues have been mentioned in the previous sections of this chapter. These issues include: failing to pay attention to detail, having trouble sustaining attention during tasks, seeming not to listen, having difficulty following direction, having trouble organizing, fidgeting or squirming frequently, running or climbing when it is inappropriate, talking excessively, and blurting out answers in class. These behavioral issues as well as several others could be the result of the child's routine at home. More behavioral issues that could influence ADHD are:

- When the child goes to sleep at night
- How much caffeine the child consumes
- How much television the child watches
- How much time the child spends playing videogames
- How much time the child spends using a computer
- How much time the child spends engaged in physical activity



- How much the child listens to music

These factors relate to the behavior therapy that can be used to treat ADHD. According to the research mentioned above regarding behavior therapy, symptoms of ADHD could be alleviated with stricter control on behaviors. A behavior therapy study in which children, ages one to three, were studied in relation to the amount of television they viewed was recently conducted. This study proved that children who watched excessive amounts of television had lower attention spans. This study also noted that “environmental exposures, including types and degrees of stimulation, affect the number and the density of neuronal synapses. The types and intensity of visual and auditory experiences that children have early in life have profound influences on brain activity” (Christakis, Zimmerman, and DiGiuseppe). This study noted that because television presents images rapidly, it can be “extremely interesting” yet also “overstimulating” and as a result may shorten attention spans which could lead to ADHD (Christakis, Zimmerman, and DiGiuseppe). Another study found similar results. This study found that there is indeed a correlation between television and ADHD-like behaviors. This study did not show that watching television causes ADHD (Miller, Marks, and Miller).

The amount of research relating environmental and behavioral factors to ADHD was miniscule compared to the amount of research conducted on the symptoms and definition of the disorder. Linda Graham, a doctor of philosophy in education, wrote an article titled, “ABC’s to ADHD: The role of schooling in the construction of behavior disorder and production of disorderly objects,” published in the *International Journal of Inclusive Education*. In this article, she states that there is a “goodness of fit between the children and the settings in which they learn, live, and play. These may be critical in whether a given child is judged to be inattentive or hyperactive. (Graham). In other words, the amount of tolerance regarding a child’s ADHD-like

symptoms determines whether or not a child is viewed as hyperactive or inattentive. Behavioral factors that might influence ADHD-like symptoms ought to be researched in more depth so that a better understanding of the disorder, its causes, and its treatments could possibly be discovered.

The research conducted in this thesis will attempt to show a relationship between ADHD-like symptoms and behavioral and environmental factors, including but not limited to television viewing, on the child.

### **Environmental and Behavioral Factors influencing ADHD Summary**

Although not much research has been done on environmental or behavioral factors that influence ADHD, this topic is increasingly important as the disorder itself, its causes, and its treatments are researched. Factors that could possibly influence ADHD include: sleep habits, television habits, caffeine habits, home environments, parent tolerance, and overstimulation. For the purpose of this study, behavioral factors such as: sleep habits, caffeine habits, television and movie habits, computer habits, iPod or other music device habits, videogame habits, and physical activity habits. The lack of sources present regarding behavioral factors and their possible influence on ADHD demonstrates the importance of an in-depth study on this topic.

### **Chapter Summary**

This chapter offered several different definitions of Attention-deficit/Hyperactivity disorder as well as the medications and treatments available to those individuals who suffer from the disorder. This chapter also provided examples of environmental and behavioral factors that could possibly influence ADHD. There is no known cure for ADHD. Most sources agree that the best way to treat this disorder is by a combination of medications such as Ritalin or Adderall and different therapies such as social skills training, parent skills training, or behavior therapy.

For the purpose of this study, a combination of the different definitions of ADHD was used. This study defines ADHD as a neurobehavioral disorder that affects children in their early school years and causes these children to have symptoms including but not limited to: failing to pay close attention to detail and making careless mistakes, becoming easily distracted by irrelevant sights and sounds, blurting out answers to questions before they have been completely asked, squirming or fidgeting, and running or climbing in situations where the behaviors is inappropriate. The research conducted in this study is directed towards discovering a possible relationship between behavioral factors such as sleep habits, caffeine habits, television and movie habits, computer habits, iPod or other music device habits, videogame habits, and physical activity habits to ADHD-like symptoms. Due to the lack of research present on this topic, this thesis provides an important discussion on ADHD and its relationship to a child's behaviors.

In the next several chapters, a more in-depth look at ADHD and its relationship to behavioral factors will be examined through the presentation of a study conducted in Helena, Montana.

### **Chapter 3: Development of Questionnaires**

Attention-deficit/hyperactivity disorder is now one of the most common neurological disorders among children. Teachers must accommodate for students with this disorder on a daily basis. Although there are many different combinations of treatments for ADHD, little research has been conducted on the relationship between a child's behaviors and exposure to media and the child's ADHD-like symptoms. The following study was conducted in order to determine whether any such relationship exists. In order to do this research, students in two fourth grade classes at the same elementary school in Helena, Montana were asked to complete student surveys concerning ADHD symptoms. As stated earlier, after gaining permission from Bruce Messinger, the superintendent of the Helena School District at the time, the principal of the school, the fourth grade teachers, the parents, and the students, thirty-six students were asked to participate in this research. As a result, the parents of the corresponding students were asked to complete a parent survey on their child's behaviors and exposure to media at home. Participants were weeded out based on the return of permission slips. Twenty-one students and twenty parents participated in this research. Due to the fact that only student surveys that had an accompanying parent survey could be considered for this study, only twenty participants were included in the final research. The student surveys were administered in the classroom while the parent surveys were conducted over the phone. Parent phone numbers were provided by the parents as part of the permission slip their child returned to the school. The distribution of the student surveys took place on October 6, 2011 and October 7, 2011 at 9:15 a.m. and 10:30 a.m. respectively. The distribution of the parent surveys took place from October 10, 2011 to October 20, 2011 at varying times between 10:00 a.m. and 8:00 p.m. based on parent request which was submitted as part of the parent permission slip.

## Development of Student Questionnaires

Most sources researching Attention-deficit/Hyperactivity Disorder offer different definitions of the disorder. Although these definitions, as mentioned in the previous chapter, are different; they all share the same basic foundation. ADHD is a neurobehavioral disorder that affects children in their early school years and causes these children to have symptoms including but not limited to: often fails to pay close attention to detail and makes careless mistakes, becomes easily distracted by irrelevant sights and sounds, often blurts out answers to questions before they have been completely asked, often squirms or fidgets, and runs or climbs in situations where the behaviors is inappropriate. In order to assess these symptoms, students were given a questionnaire that listed statements that related to all of these aspects of ADHD. Students were asked to respond with one of the following choices: Never, Sometimes, Often, or Very Often.

Survey items one, two, six, and seven assessed ADHD-like symptoms such as: Fails to pay close attention to detail and makes careless mistakes. The statements were: *1. I fail to pay close attention to details or I make careless mistakes in schoolwork, work, or other activities; 2. I have difficulty keeping my attention on tasks or play activities; 6. I avoid, dislike, or am unwilling to engage in tasks that require sustained mental effort (such as homework); and 7. I lose things that are necessary for tasks or activities (toys, school assignments, pencils, books, or tools).*

Survey items three, four, five, eight, and nine assessed ADHD-like symptoms such as: Often becomes easily distracted by irrelevant sights and sounds. The statements were: *3. I do not listen when someone is talking to me directly; 4. I do not follow instructions and fail to finish*

*my schoolwork, chores, or duties; 5. I have difficulty organizing; 8. I am easily distracted by outside stimuli; and 9. I am forgetful in daily activities.*

Survey items thirteen, fifteen, sixteen, and eighteen assessed ADHD-like symptoms such as: Often blurts out answers before they have been asked completely. The statements were: *13. I have trouble being quiet in class even if I am told to limit my conversation; 15. I talk too much in class; 16. I blurt out answers before questions have been completed or when someone else is talking; and 18. I interrupt or intrude on others (such as butting into conversations or games).*

Survey items ten and seventeen assessed ADHD-like symptoms such as: Often squirms or fidgets. The statements were: *10. I fidget with my hands or feet or I squirm in my seat; and 17. I have trouble waiting my turn.*

Survey items eleven, twelve, and fourteen assessed ADHD-like symptoms such as: Runs or climbs in situations where the behavior is inappropriate. The statements were: *11. I leave my seat in the classroom or in other situations in which I am supposed to remain seated; 12. I run or walk about or climb too much in situations in which it is inappropriate; and 14. I move around too much in the classroom.*

### **Development of Parent Questionnaires**

In order to assess the relationship between behavior and ADHD, parents were asked to participate in this research as well. The parent questionnaires asked parents questions that related to sleep habits, caffeine habits, television and movie habits, computer habits, iPod or other music device habits, videogame habits, and physical activity habits—all habits that could maybe influence ADHD-like symptoms.

Survey items one, two, three, and four on the parent questionnaire asked about the student's sleep habits. The questions were: *1. What time does your child usually go to bed on*

*school nights? 2. What is the main reason your child goes to bed at a particular time? 3. What time does your child usually wake up on school day mornings? 4. What usually wakes your child up in the mornings on school days?* On survey items one and three, parents were asked to give a time range. On item two, parents were asked to choose from the following: it fits best with the families schedule; he/she feels sleepy then; that is when her/his TV shows are over; that is when her/his brothers and sisters go to bed; or to get enough sleep. On survey item four, parents were asked to choose from the following: alarm clock; needs to go to the bathroom; parent or other family member; spontaneous; noise; or other.

Survey item five on the parent questionnaire asked about the student's caffeine habits. The question was: *5. How much caffeinated soda does your child drink?* On survey item five, parents were asked to choose from one of the following: more than 3 glasses per day; between 1 and 3 glasses per day; less than one glass per day; none; don't know.

Survey items six, seven, eight, nine, and eighteen on the parent questionnaire asked about the student's television and movie habits. The questions were: *6. How much television and/or videos does your child watch on school days? 7. How much television and/or videos does your child watch on weekend days? 8. Does your child have a television set in his/her bedroom? 9. Does your child watch television and/or videos in the 30 minutes before falling asleep? 18. What types of television shows does your child typically watch? Are these television shows interactive?* On survey items six and seven, parents were asked to choose from the following: 0-2 hours per day; 2-4 hours per day; 4-6 hours per day; 6-8 hours per day; more than 8 hours per day; don't know. On item eight, parents were asked to answer yes or no. On item nine, parents were asked to choose from the following: every night; 5-6 nights; 3-4 nights; 1-2 nights; not at

all. On item eighteen, parents were asked to list television programs or movies and answer yes or no to the question, “Are these television shows interactive?”

Survey items ten, eleven, and nineteen on the parent questionnaire asked about the student’s computer habits. The questions were: *10. How much time does your child spend on the computer on school days? 11. How much time does your child spend on the computer on weekend days? 19. What types of computer/videogames does your child typically play? Are these games interactive?* On survey items ten and eleven, parents were asked to choose from the following: every night; 5-6 nights; 3-4 nights; 1-2 nights; not at all. On question nineteen, parents were asked to list the computer games and answer yes or no to the question, “Are these games interactive?”

Survey items twelve and thirteen on the parent questionnaire asked about the student’s iPod and other music device habits. The questions were: *12. How many hours does your child spend listening to an iPod or other music device on school days? 13. How many hours does your child spend listening to an iPod or other music device on weekend days?* On items twelve and thirteen, parents were asked to choose from the following: every night; 5-6 nights; 3-4 nights; 1-2 nights; not at all.

Survey items fourteen, fifteen, and nineteen on the parent questionnaire asked about the student’s videogame habits. The questions were: *14. How many hours does your child spend playing videogames on school days? 15. How many hours does your child spend playing videogames on weekend days? 19. What types of computer/videogames does your child typically play? Are these games interactive?* On items fourteen and fifteen, parents were asked to choose from the following: every night; 5-6 nights; 3-4 nights; 1-2 nights; not at all. On item nineteen,



parents were asked to list videogames and answer yes or no to the question “Are these games interactive?”

Survey items sixteen and seventeen on the parent questionnaire asked about the student’s physical activity habits. The questions were: *16. How many hours does your child spend playing outside either with peers or alone, or participating in physical activities such as a sport on a school day?* *17. How many hours does your child spend playing outside either with peers or alone, or participating in physical activities such as a sport on a weekend day?* On items sixteen and seventeen, parents were asked to choose from the following: every night; 5-6 nights; 3-4 nights; 1-2 nights; not at all.

### **Population**

As previously stated, in order to do this research, students in two fourth grade classes at the same elementary school in Helena, Montana were asked to complete student surveys concerning ADHD symptoms. After gaining permission from Bruce Messinger, the superintendent of the Helena School District at the time, the principal of the school, the fourth grade teachers, the parents, and the students, thirty-six students were asked to participate in this research. As a result, the parents of the corresponding students were asked to complete a parent survey on their child’s behaviors and exposure to media at home. Participants were weeded out based on the return of permission slips. Twenty-one students and twenty parents participated in this research. Due to the fact that only student surveys that had an accompanying parent survey could be considered for this study, only twenty participants were included in the final research. The student surveys were administered in the classroom while the parent surveys were conducted over the phone. Parent phone numbers were provided by the parents as part of the permission slip their child returned to the school. The distribution of the student surveys took place on

October 6, 2011 and October 7, 2011 at 9:15 a.m. and 10:30 a.m. respectively. The distribution of the parent surveys took place from October 10, 2011 to October 20, 2011 at varying times between 10:00 a.m. and 8:00 p.m. based on parent request which was submitted as part of the parent permission slip. The students were told that participation in this research would not impact their grade. Twenty-one students completed the questionnaire. Of those only twenty were used in this study. There were seven males and thirteen females surveyed. Out of twenty-one parents, only twenty parents completed the survey, and therefore only twenty students were used for this study.

### **Distribution of Questionnaires**

The student questionnaires were administered on October 6, 2011 and October 7, 2011 in the school classrooms at 9:15 a.m. and 10:30 a.m. respectively. In order to complete administration of the questionnaires, the student surveys were completed as a whole group to avoid any reading miscues that might have altered student understanding of the questions. To do this, the statements were read out loud and students answered by filling in the correct bubble on their surveys. The parent surveys were administered from October 10, 2011 to October 20, 2011 from 10:00 a.m. to 8:00 p.m. based on parent request provided on the permissions slip. Phone numbers were provided by the parent in a space on the permission slip. Parent surveys were conducted over the phone from a secure environment.

### **Summary**

Questionnaires were administered to students and parents in order to determine if a relationship between student behaviors at home related to student proneness to ADHD-like symptoms. Student surveys were administered in the schools as a whole group. Parent surveys were administered over the phone from a secure environment.

## Chapter 4: Results of Questionnaires

To assess the relationship between student-perceived tendencies exhibited at school and student behaviors shown at home, a survey was administered to students with 18 statements regarding attention-deficit/hyperactivity disorder. In addition to this survey, a 19 question questionnaire was administered to parents regarding student behavior at home.

### Student Questionnaires

Each statement from the student questionnaire is listed below and followed by a table which shows the results of all the students who participated in this study. On the student questionnaires, a scale similar to a Likert scale was used in order to represent the extent to which the students agreed or disagreed with the statement. A Likert scale uses numbers to represent the extent to which the students agree or disagree with a statement. The scale used for this study included the words never, sometimes, often, and very often. Students were asked to circle the correct bubble beneath the word that best described how often they demonstrated the behavior.

The first nine statements assessed student inattention. Statements 10 through 18 assessed student hyperactivity. Statement one asked students to respond to the statement: *I fail to pay close attention to details or I make careless mistakes in schoolwork, work, or other activities.* Table one represents the frequency of responses regarding statement one. It also shows the mode of responses for statement one.

Table 1 Frequency of Responses for Statement One

Never	Sometimes	Often	Very Often	Total
6	11	3	0	20

Statement one produced high responses to “sometimes” meaning that the majority of the participants believed they sometimes failed to pay close attention to details or they made careless mistakes.

Statement two asked students to respond to the statement: *I have difficulty keeping my attention on tasks or play activities*. Table two shows the frequency of responses regarding statement two.

Table 2 Frequency of Responses for Statement Two

Never	Sometimes	Often	Very Often	Total
12	7	0	1	20

Statement two revealed that 60% of participants who responded to this statement responded with “never”. This means that these participants believed they never had difficulty keeping their attention on tasks or play activities. Only one student responded with “very often”.

Statement three asked students to respond to the statement: *I do not listen when someone is talking to me directly*. Table three shows the frequency of responses regarding statement three.

Table 3 Frequency of Responses for Statement Three

Never	Sometimes	Often	Very Often	Total
12	5	1	2	20

Statement three showed that the majority of participants who responded to this statement responded with “never”. This means that most participants believed they always listened when someone was talking to them directly.

Statement four asked students to respond to the statement: *I do not follow instructions and fail to finish my schoolwork, chores, or duties.* Table four shows the frequency of responses regarding statement four.

Table 4 Frequency of Responses for Statement Four

Never	Sometimes	Often	Very Often	Total
15	4	0	1	20

Again, statement four showed that the majority of participants who responded to this statement responded with “never”. This means that 75% of the participants believed they always followed instructions and never failed to finish schoolwork, chores, or other duties.

Statement five asked students to respond to the statement: *I have difficulty organizing.* Table five shows the frequency of responses regarding statement five.

Table 5 Frequency of Responses for Statement Five

Never	Sometimes	Often	Very Often	Total
5	8	2	5	20

Forty percent of participants responded with “sometimes” for statement five. Twenty-five percent of students responded with “very often” for statement five. This means that one quarter of the participants believed they had difficulty organizing.

Statement six asked students to respond to the statement: *I avoid, dislike, or am unwilling to engage in tasks that require sustained mental effort (such as homework).* Table six shows the frequency of responses regarding statement six.

Table 6 Frequency of Responses for Statement Six

Never	Sometimes	Often	Very Often	Total
11	6	2	1	20

The results in table six show that the majority of participants selected “never” as their response to statement six. Only one student responded with “very often”. Thirty percent of participants responded with “sometimes”.

Statement seven asked students to respond to the statement: *I lose things that are necessary for tasks or activities (toys, school assignments, pencils, books, or tools)*. Table seven shows the frequency of responses regarding statement seven.

Table 7 Frequency of Responses for Statement Seven

Never	Sometimes	Often	Very Often	Total
13	5	1	1	20

The majority of participants, sixty-five percent of students, responded with “never” to this statement. Only one participant selected the response “very often”.

Statement eight asked students to respond to the statement: *I am easily distracted by outside stimuli*. Table eight shows the frequency of responses regarding statement eight.

Table 8 Frequency of Responses for Statement Eight

Never	Sometimes	Often	Very Often	Total
7	8	2	3	20

While the mode, sometimes, represents forty percent of the participants, the response “never” follows close behind with thirty-five percent of the participants selecting this as a response.

Three students selected very often as a response that best fits their behavior.

Statement nine asked students to respond to the statement: *I am forgetful in daily activities*. Table nine shows the frequency of responses regarding statement nine.

Table 9 Frequency of Responses for Statement Nine

Never	Sometimes	Often	Very Often	Total
10	5	2	3	20

The responses for statement nine were spread out. Fifty percent responded “never”, twenty-five percent responded “sometimes”, ten percent responded “often”, and fifteen percent responded “very often”. The majority of participants responded with “never”.

Statements ten through eighteen focused on the hyperactivity aspect of ADHD.

Statement ten asked students to respond to the statement: *I fidget with my hands or feet or I squirm in my seat*. Table 10 shows the frequency of responses regarding statement ten.

Table 10 Frequency of Responses for Statement Ten

Never	Sometimes	Often	Very Often	Total
11	4	2	3	20

Most participants believed that they did not fidget or squirm in their seats, therefore they responded with “never”.

Statement eleven asked students to respond to the statement: *I leave my seat in the classroom or in other situations in which I am supposed to remain seated.* Table 11 shows the frequency of responses regarding statement eleven.

Table 11 Frequency of Responses for Statement Eleven

Never	Sometimes	Often	Very Often	Total
13	6	0	1	20

Sixty-five percent of participants believed they remain in their seats when they were asked to do so. This statement received no responses in the “often” choice slot.

Statement twelve asked students to respond to the statement: *I run or walk about or climb too much in situations in which it is inappropriate.* Table 12 shows the frequency of responses regarding statement twelve.

Table 12 Frequency of Responses for Statement Twelve

Never	Sometimes	Often	Very Often	Total
16	3	1	0	20

Almost all of the participants responded to statement twelve with “never”. Eighty percent of participants responded this way. No participants chose “very often” as the response to this question.

Statement thirteen asked students to respond to the statement: *I have trouble being quiet in class even if I am told to limit my conversation.* Table 13 shows the frequency of responses regarding statement thirteen.



Table 13 Frequency of Responses for Statement Thirteen

Never	Sometimes	Often	Very Often	Total
8	11	1	0	20

Fifty-five percent of participants thought that they “sometimes” had trouble being quiet in class, even if they were told to limit conversation. No participants thought that they “always” had trouble being quiet in class.

Statement fourteen asked students to respond to the statement: *I move around too much in the classroom*. Statement fourteen is similar to statements ten and eleven. Table 14 shows the frequency of responses regarding statement fourteen.

Table 14 Frequency of Responses for Statement Fourteen

Never	Sometimes	Often	Very Often	Total
10	7	1	2	20

It is interesting to note that although statements ten, eleven, and fourteen ask similar questions, the responses were all different. For statement ten, eleven participants responded with “never”; four responded with “sometimes”; two responded with “often”, and three responded with “very often”. For statement eleven, thirteen participants responded with “never”; six responded with “sometimes”, zero responded with “often”, and one responded with “very often”. For statement fourteen, ten participants responded with “never”; seven responded with “sometimes”, one responded with “often”, and two responded with “very often”.

Statement fifteen asked students to respond to the statement: *I talk too much in class*.

Table 15 shows the frequency of responses to statement fifteen.

Table 15 Frequency of Responses for Statement Fifteen

Never	Sometimes	Often	Very Often	Total
9	8	1	2	20

Statement fifteen was similar to statement thirteen. For statement thirteen, eight participants responded with “never”; eleven responded with “sometimes”; one responded with “often”; and zero responded with “very often”. These results were similar to the results for statement fifteen as seen above.

Statement sixteen asked students to respond to the statement: *I blurt out answers before questions have been completed or when someone else is talking.* Table 16 shows the frequency of responses to statement sixteen.

Table 16 Frequency of Responses for Statement Sixteen

Never	Sometimes	Often	Very Often	Total
11	3	2	1	20

Over half of the participants responded to statement sixteen with “never” as their response.

Statement seventeen asked students to respond to the statement: *I have trouble waiting my turn.* Table 17 shows the frequency of responses to statement seventeen.

Table 17 Frequency of Responses for Statement Seventeen

Never	Sometimes	Often	Very Often	Total
13	6	0	1	20

Again, over half of the participants selected “never” as their response. Only one participant responded with “very often”.

Statement eighteen asked students to respond to the statement: *I interrupt or intrude on others (such as butting into conversations or games)*. Table 18 shows the frequency of responses to statement eighteen.

Table 18 Frequency of Responses for Statement Eighteen

Never	Sometimes	Often	Very Often	Total
13	4	3	0	20

Although statements sixteen, seventeen, and eighteen, did not ask the exact same question, they were similar. They received similar number of responses as well. Overall, the mode for all of the statements was either “never” or “sometimes”. The responses “often” and “very often” were the least selected responses to all of the statements on this questionnaire.

### **Parent Questionnaires**

Each statement from the parent questionnaire is listed below and followed by a table which shows the results off all the parents who participated in this study. Parents were contacted via phone from a secure environment. On the first and third question, parents were asked to give a range as an answer. The ranges were collected and the number of responses in each range was charted. The questions in the parent questionnaire pertain to sleep habits, caffeine habits, television and movie habits, computer habits, iPod or other music device habits, videogame habits, and physical activity habits. These questions related to both school days and weekend days. Many parents made side comments as they were answering questions on the survey. These comments as well as the types of television shows, movies, videogames, and computer games can be found in Appendix C.

Each question from the parent questionnaire is stated below, followed by the number of responses. Question one asked: *What time does your child usually go to bed on school nights?*

Table A shows the frequency of responses to question one.

Table A Frequency of Responses to Question One

Time Range	7:30-8:00pm	8:00-8:30pm	8:30-9:00pm	9:00-10:00pm
#Parents	1	9	9	1

Most participants went to sleep between the hours of 8:00 and 9:00 pm.

Question two asked: *What is the main reason your child goes to bed at a particular time?*

Parents were given several options. Table B shows the frequency of responses to question two.

Table B Frequency of Responses to Question Two

Response	Fits with schedule	Sleepy	TV shows are over	Siblings go to bed	Get enough sleep	Other
#Parents	7	0	1	0	11	5

For question two, parents were allowed to give more than one answer. That is why the total number of responses is greater than twenty.

Question three asked: *What time does your child usually wake up on school day mornings?* Table C shows the frequency of responses to question three.

Table C Frequency of Responses to Question Three

Time Range	5:30-6:00am	6:00-6:30am	6:30-7:00am	7:00-7:30am
#Parents	2	10	3	5

Most participants woke up between 6:00 and 6:30 am. This means that the majority of the participants received the recommended eight hours of sleep. Some received more than eight.

Question four asked: *What usually wakes up your child in the mornings on school days?*

Table D shows the frequency of responses to question four.

Table D Frequency of Responses to Question Four

Response	Alarm Clock	Needs restroom	Parent or family member	Spontaneous	Noise	Other
#Parents	5	0	13	1	0	6

Most participants were woken up by their parent or another family member.

Question five was related to caffeine consumption. Question five asked: *How much caffeinated soda does your child drink?* Table E shows the frequency of responses to question five.

Table E Frequency of Responses to Question Five

#Glasses per day	More than 3	1-3	Less than 1	None	I don't know
#Parents	0	1	9	10	0

Most participants consumed less than one glass of caffeinated soda per day.

Question six asked: *How much television and/or videos does your child watch on school days?* Table F shows the frequency of responses to question six.

Table F Frequency of Responses to Question Six

#Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
#Parents	15	5	0	0	0	0

Most parents reported that their child watched less than two hours of television on a school day.

Question seven asked: *How much television and/or videos does your child watch on weekend days?* Table F-1 shows the frequency of responses to question seven.

Table F-1 Frequency of Responses to Question Seven

#Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
#Parents	4	11	2	1	1	1

Based on these numbers, more participants watched more television on the weekends than on a school day.

Question eight asked: *Does your child have a television set in his/her bedroom?* Table G shows the frequency of responses to question eight.

Table G Frequency of Responses to Question Eight

Television set present?	Yes	No
# Parents	6	14

Fewer participants had television sets in their rooms than students who did have television sets in their rooms.

Question nine asked: *Does your child watch TV and/or videos in the 30 minutes before falling asleep?* Table G-1 shows the frequency of responses to question nine.

Table G-1 Frequency of Responses to Question Nine

# of Nights per week	Every night	5-6 nights	3-4 nights	1-2 nights	Not at all
# Parents	2	1	2	2	13

Most participants did not watch television or movies in the 30 minutes before falling asleep.

Question ten asked: *How much time does your child spend on the computer on school days?* Table H shows the frequency of responses to question ten.

Table H Frequency of Responses to Question Ten

# of Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
# Parents	20	0	0	0	0	0

Every parent responded with 0-2 hours on this question.

Question eleven asked: *How much time does your child spend on the computer on weekend days?* Table H-1 shows the frequency of responses to question eleven.

Table H-1 Frequency of Responses to Question Eleven

# of Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
# Parents	16	1	1	1	0	2

The numbers of hours student participants spent on the computer on weekends was similar to the number of hours student participants spent on computers during the school week.

Question twelve asked: *How many hours does your child spend listening to an iPod or other music devices on school days?* Table I shows the frequency of responses to question twelve.

Table I Frequency of Responses to Question Twelve

# of Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
# Parents	18	1	0	0	1	0

Most parents responded with 0-2 hours per day.

Question thirteen asked: *How many hours does your child spend listening to an iPod or other music devices on weekend days?* Table I-1 shows the frequency of responses to question thirteen.

Table I-1 Frequency of Responses to Question Thirteen

# of Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
# Parents	16	3	0	0	0	1

Still, most parents responded with 0-2 hours per day.

Question fourteen asked: *How many hours does your child spend playing videogames on school days?* Table J shows the frequency of responses to question fourteen.

Table J Frequency of Responses to Question Fourteen

# of Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
# Parents	20	0	0	0	0	0

Every parent responded with 0-2 hours per day.

Question fifteen asked: *How many hours does your child spend playing videogames on weekend days?* Table J-1 shows the frequency of responses to question fifteen.

Table J-1 Frequency of Responses to Question Fifteen

# of Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
# Parents	12	6	1	0	0	1



The majority of parents responded with 0-2 hours per day. Six parents responded with 2-4 hours per day and one parent responded with 4-6 hours per day.

Question sixteen asked: *How many hours does your child spend playing outside either with peers or alone, or participating in physical activities such as a sport on a school day?*

Table K shows the frequency of responses to question sixteen.

Table K Frequency of Responses to Question Sixteen

# of Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
# Parents	13	5	1	0	0	0

Most parents responded with 0-2 hours per day.

Question seventeen asked: *How many hours does your child spend playing outside either with peers or alone, or participating in physical activities such as a sport on a weekend day?*

Table K-1 shows the frequency of responses to question seventeen.

Table K-1 Frequency of Responses to Question Seventeen

# of Hours per day	0-2	2-4	4-6	6-8	More than 8	I don't know
# Parents	0	8	8	1	2	1

No parents responded with 0-2 hours per day. The majority of the parents responded with 2-6 hours of physical activity per day.

Question eighteen asked: *What types of television shows does your child typically watch? Are these television shows interactive?* The types of television shows are listed in Appendix C under parent comments. Table L shows the frequency of responses to the second part of question eighteen.

Table L Frequency of Responses to Question Eighteen

Are these shows interactive?	Yes	No	No Television Set
# Parents	1	18	1

Ninety percent of parents responded that the television shows their child watched were not interactive.

Question nineteen asked: *What types of computer/videogames does your child typically play?* The types of computer and videogames are listed in Appendix C under parent comments.

Table L-1 shows the frequency of the responses to the second part of question nineteen.

Table L-1 Frequency of Responses to Question Nineteen

Are these games interactive?	Yes	No	No Computer
# Parents	20	0	0

One hundred percent of parents acknowledged that the games their child played were interactive.

### **Relationship between Student and Parent Questionnaires**

The purpose of this study was to examine the relationship between personal behaviors at home (such as sleep habits, caffeine habits, television and movie habits, computer habits, iPod or other music device habits, videogame habits, and physical activity habits) and attention-deficit/hyperactivity disorder. In order to compare these, the student surveys in which students selected the response option “never” less than five times and the response options “often” or “very often” more than five times were considered students most likely to have ADHD-like symptoms. There were four participants whose responses qualified them for further study. In order to take a closer

look at these students, the student survey and their corresponding parent survey will be compared. These students have been assigned numbers for confidentiality reasons.

Student 1 replied “never” to student questionnaire numbers 11, 12, and 14. These questions were: *11. I leave my seat in the classroom or in other situations in which I am supposed to remain seated; 12. I run or walk about or climb too much in situations in which it is inappropriate; and 14. I move about too much in the classroom.* Student 1 replied “sometimes” to questions 2, 4, 13, 15, 16 and 17. These questions were: *2. I have difficulty keeping my attention on tasks or play activities; 4. I do not follow instructions and fail to finish my schoolwork, chores, or duties; 13. I have trouble being quiet in class even if I am told to limit my conversation; 15. I talk too much in class; 16. I blurt out answers before questions have been completed or when someone else is talking; and 17. I have trouble waiting my turn.* Student 1 replied “often” to questions 1, 3, 7, 8, 9, 10, and 18. These questions were: *1. I fail to pay close attention to details or I make careless mistakes in schoolwork, work, or other activities; 3. I do not listen when someone is talking to me directly; 7. I lose things that are necessary for tasks or activities (toys, school assignments, pencils, books, or tools); 8. I am easily distracted by outside stimuli; 9. I am forgetful in daily activities; 10. I fidget with my hands or feet or I squirm in my seat; and 18. I interrupt or intrude on others (such as butting into conversations or games).* Student 1 replied “very often” to questions 5 and 6. These questions were: *5. I have difficulty organizing and 6. I avoid, dislike, or am unwilling to engage in tasks that require sustained mental effort (such as homework).* Parent 1 reported that Student 1 goes to bed at 9 because it fit with the family schedule and to get enough sleep for the following day’s activities. Student 1 woke up at 6:30 and is woken up by a parent or other family member. Student 1 drank less than one glass of caffeinated soda per day. On a typical school day, Student 1 watched 0-2 hours of

television, spent 0-2 hours on the computer, spent 0-2 hours per listening to music, spent 0-2 hours playing videogames, and spent 0-2 hours playing outside with peers. On a typical weekend day, Student 1 watched 2-4 hours of television, spent 2-4 hours on the computer, spent 0-2 hours listening to music, spent 2-4 hours playing videogames, and spent 2-4 hours playing outside with peers. Student 1 did not have a television set in his or her bedroom. Student 1 watched television in the 30 minutes before falling asleep 1-2 nights per week. Student 1 did not watch educational television programs or play educational computer/videogames.

The questions that Student 1 replied to with “never” all relate to movement around the classroom. This student replied with “sometimes” to questions that all relate to following directions, interrupting, and talking too much in class. This student replied with “often” to questions that all relate to making careless mistakes and being forgetful. This student replied with “very often” to questions that relate to organization and focusing on tasks that require mental effort. Although this student had decent sleep habits and caffeine habits, it is possible that this student’s responses relate to his or her exposure to television, computer, and videogames during the weekends. This student spent 2-4 hours every weekend day on the television, the computer, and playing videogames—this equates to 6-12 hours every weekend. This student also watched television in the 30 minutes before going to bed on the weekend nights. The television programs and computer games this student watched and played were not educational.

Student 2 replied “never” to student questionnaire questions 3, 4, 7, and 12. These questions were: *3. I do not listen when someone is talking to me directly; 4. I do not follow instructions and fail to finish my schoolwork, chores or duties; 7. I lose things that are necessary for tasks or activities (toys, school assignments, pencils, books, or tools); and 12. I run or walk about or climb too much in situations in which it is inappropriate.* Student 2 replied

“sometimes” to questions 1, 6, 11, and 17. These questions were: *1. I fail to pay close attention to details or I make careless mistakes in schoolwork, work, or other activities; 6. I avoid, dislike, or am unwilling to engage in tasks that require sustained mental effort (such as homework); 11. I leave my seat in the classroom or in other situations in which I am supposed to remain seated; and 17. I have trouble waiting my turn.* Student 2 replied “often” to questions 13 and 18. These questions were: *13. I have trouble being quiet in class even if I am told to limit my conversation; and 18. I interrupt or intrude on others (such as butting into conversations or games).* Student 2 replied “very often” to questions 2, 5, 8, 9, 10, 14, 15, and 16. These questions were: *2. I have difficulty keeping my attention on tasks or play activities; 5. I have difficulty organizing; 8. I am easily distracted by outside stimuli; 9. I am forgetful in daily activities; 10. I fidget with my hands or I squirm in my seat; 14. I move around too much in the classroom; 15. I talk too much in class; and 16. I blurt out answers before questions have been completed or when someone else is talking.* Parent 2 reported that student 2 went to bed between 8:15 and 8:30 to get enough sleep for the following day’s activities and woke up at 6:30. Student 2 was woken up by a parent or other family member. Student 2 did not drink any caffeinated soda. On a typical school day, Student 2 watched 0-2 hours of television, spent 0-2 hours on the computer, spent 0-2 hours listening to music, spent 0-2 hours playing videogames, and spent 0-2 hours playing outside with peers. On a typical weekend day, Student 2 spent 2-4 hours watching television, spent 0-2 hours on the computer, spent 0-3 hours listening to music, spent 0-2 hours playing videogames, and spent 4-6 hours playing outside with peers. Student 2 did not have a television set in his or her bedroom and never watched television in the 30 minutes before falling asleep. Student 2 watched educational television programs and played only educational computer and videogames.

The questions Student 2 replied with “never” all relate to following directions and paying attention. The questions Student 2 replied with “sometimes” all relate to staying focused for long periods of time. The questions Student 2 replied with “often” all relate to interrupting others. The questions Student 2 replied with “very often” were split evenly between the aspects of ADHD that relate to attention span and the aspects of ADHD that relate to hyperactivity. Student 2 had decent sleeping and caffeine habits. Student 2 did not watch an excessive amount of television. The only television programs this student watched were educational. Student 2 did not spend an excessive amount of time on the computer or playing videogames. When this student was on the computer, only educational games were played. Student 2 spent 4-6 hours playing outside on the weekends. There was no true relationship between this student’s ADHD-like symptoms and his or her behaviors at home.

Student 3 responded to the student questionnaire questions with “never” to questions 4 and 17. These questions were: *4. I do not follow instructions and fail to finish my schoolwork, chores, or duties; and 17. I have trouble waiting my turn.* Student 3 responded with “sometimes” to questions 2, 3, 11, 12, 13, and 18. These questions were: *2. I have difficulty keeping my attention on tasks or play activities; 3. I do not listen when someone is talking to me directly; 11. I leave my seat in the classroom or in other situations in which I am supposed to remain seated; 12. I run or walk about or climb too much in situations in which it is inappropriate; 13. I have trouble being quiet in class even if I am told to limit my conversation; and 18. I interrupt or intrude on others (such as butting into conversations or games).* Student 3 responded with “often” to questions 1, 6, 14, and 16. These questions were: *1. I fail to pay close attention to details or I make careless mistakes in school work, work, or other activities; 6. I avoid, dislike, or am unwilling to engage in tasks that require sustained mental effort (such as*

homework); 14. *I move around too much in the classroom;* and 16. *I blurt out answers before questions have been completed or when someone else is talking.* Student 3 replied with “very often” to questions 5, 7, 8, 9, 10, and 15. These questions were: 5. *I have difficulty organizing;* 7. *I lose things that are necessary for tasks or activities (toys, school assignments, pencils, books, or tools);* 8. *I am easily distracted by outside stimuli;* 9. *I am forgetful in daily activities;* 10. *I fidget with my hands or feet or I squirm in my seat;* and 15. *I talk too much in class.* Parent 3 reported that Student 3 went to bed between 9:00 and 10:00 and woke up at 6:00. Student 3 was woken up by a parent or other family member. Student 3 drank between 1 and 3 glasses of caffeinated soda per day. On a typical school day, Student 3 watched 2-4 hours of television, spent 0-2 hours on the computer, spent 0-2 hours listening to music, spent 0-2 hours playing videogames, and spent 2-4 hours playing outside with peers. On a typical weekend day, Student 3 spent 0-2 hours watching television, spent 0-2 hours on the computer, spent 0-3 hours listening to music, spent 0-2 hours playing videogames, and spent more than 8 hours playing outside with peers. Student 3 did have a television set in his or her bedroom and watched television in the 30 minutes before falling asleep every night. Student 3 watched only horror television programs and movies and played only war games on the computer.

The questions Student 3 responded to with “never” relate to following directions and taking turns. The questions Student 3 responded to with “sometimes” relate to paying attention to tasks, and moving about too often. The questions Student 3 responded to with “often” relate to engaging in tasks that require mental effort, blurting out, and moving about. The questions Student 3 responded to with “very often” relate mostly to the attention span aspect of ADHD. This student had difficulty with organization, forgetfulness and interrupting. This student received the recommended eight hours of sleep. This student drank 1-3 glasses of soda per day.

This amount was high when compared to the rest of the class. This student also watched television 2-4 hours a day during the school week and watched television every night before he or she falls asleep. The types of television programs and movies this student watched were violent and not educational.

Student 4 responded to the student questionnaire questions with the response option “never” for question 16. These questions were: *16. I blurt out answers before questions have been completed or when someone else is talking.* Student 4 responded with the response “sometimes” to questions 2, 6, 7, and 13. These questions were: *2. I have difficulty keeping my attention on tasks or play activities; 6. I avoid, dislike, or am unwilling to engage in tasks that require sustained mental effort (such as homework); 7. I lose things that are necessary for tasks or activities (toys, school assignments, pencils, books, or tools); and 13. I have trouble being quiet in class even if I am told to limit my conversation.* Student 4 responded with the response “often” to questions 1, 5, 9, 12, 15, and 18. These questions were: *1. I fail to pay close attention to details or I make careless mistakes in schoolwork, work, or other activities; 5. I have difficulty organizing; 9. I am forgetful in daily activities; 12. I run or walk about or climb too much in situations in which it is inappropriate; 15. I talk too much in class; and 18. I interrupt or intrude on others (such as butting into conversations or games).* Student 4 responded with the response “very often” to questions 3, 4, 8, 10, 11, 14, and 17. These questions were: *3. I do not listen when someone is talking to me directly; 4. I do not follow instructions and fail to finish my schoolwork, chores, or duties; 8. I am easily distracted by outside stimuli; 10. I fidget with my hands or feet or I squirm in my seat; 11. I leave my seat in the classroom or in other situations in which I am supposed to remain seated; 14. I move around too much in the classroom; and 17. I have trouble waiting my turn.* Parent 4 reported that Student 4 went to bed at 8:00 because it fit



with the family schedule. Student 4 woke up at 6:15 and is woken up by a parent or other family member. Student 4 drank 1-2 glasses of caffeinated soda per week. On a typical school day, Student 4 watched television 0-2 hours, spent 0-2 hours on the computer, spent 0-2 hours listening to music, spent 0-2 hours playing videogames, and spent 0-2 hours playing outside with peers. On a typical weekend day, Student 4 watched television 6-8 hours, spent 0-2 hours on the computer, spent 0-2 hours listening to music, spent 2-4 hours playing videogames, and spent 2-4 hours playing outside with peers. Student 4 did not have a television set in his or her bedroom and never watched television in the 30 minutes before falling asleep. The television shows, computer games, and videogames Student 4 watched or played were not educational.

The questions Student 4 replied with the response “sometimes” all relate to maintaining attention. The questions Student 4 replied with the response “often” all relate to paying attention to details, blurting out, and moving about too often. The questions Student 4 replied with the response “very often” relate to attention span and fidgeting. Both aspects of ADHD, attention span and hyperactivity, are evenly represented in this last category. Student 4 had decent sleep habits and caffeine habits. This student watched television between 6 and 8 hours per day during weekend days. This student also spent between 4 and 6 hours playing videogames on the weekend days. This means that during a typical weekend day this student was in front of a television screen between 10 and 14 hours out of the day. This would basically be from morning until night. This student did not watch educational television programs or play educational videogames.

### **Summary**

To assess the relationship between student tendencies towards attention-deficit/hyperactivity disorder and behaviors exhibited at home, student and parent questionnaires were

administered. In order to complete the questionnaires, students needed to acquire parent permission. Out of thirty-six total students, only twenty-one were willing to participate. Out of the twenty-one that were willing to participate in the research, only twenty parents completed the parent questionnaire.

The responses to the student questionnaires focused on symptoms of ADHD. The first nine questions focused on the attention deficit aspect of the disorder while the second nine questions focused on the hyperactivity aspect of the disorder.

The responses to the parent questionnaires focused on student behaviors shown at home such as sleep habits, caffeine habits, television and movie habits, computer habits, iPod or other music device habits, videogame habits, and physical activity habits. These questions related to both school days and weekend days.

Out of the twenty students who completed questionnaires, only four students showed significant ADHD-like symptoms. Out of these four students, three student surveys and their corresponding parent surveys seemed to indicate some relationship between ADHD-like symptoms and the students' behaviors at home.

## **Chapter 5: Conclusion and Suggestion for Further Study**

Since 1845, when attention-deficit/hyperactivity disorder was first described in a children's poem, this disorder has grown to be a buzz word in education. Many organizations that offer different definitions of ADHD include but are not limited to: Centers for Disease Control and Prevention, the Mayo Clinic, the National Institute of Mental Health, the National Institute of Neurological Disorders and Stroke, and The National Association of Parents with Children in Special Education. Many individuals also offer their own definitions of ADHD. These individuals include but are not limited to: Dr. Heinrich Hoffman, Dr. Edward M. Hallowell, Dr. John J. Ratey, and Russell A. Barkley. In addition to all of the definitions of ADHD that exist, just as many, if not more, treatment styles for ADHD and preferences as to how to treat the disorder exist. Every treatment for ADHD must be what works best for the child, or adult, suffering from the disorder. The purpose of this paper was to delve further into the possibility of a relationship between a child's behaviors at home with relation to sleep habits, caffeine habits, television and movie habits, computer habits, iPod or other music device habits, and physical activity habits and ADHD-like symptoms.

The third and fourth chapters of this paper report the study that was conducted to assess the relationship between student behaviors and ADHD-like symptoms. This study was not meant to diagnose ADHD in any way. Only certain health professionals such as psychiatrists, psychologists, pediatricians, and neurologists are able to diagnose this disorder. The purpose of this study was to determine if behaviors had any impact on ADHD-like symptoms. If there was a relationship between behavior and ADHD-like symptoms, this disorder could be managed through intensive behavior alterations. In order to conduct this research, students in two fourth grade classes at the same elementary school in Helena, Montana were asked to complete student

surveys concerning ADHD symptoms. After gaining permission from Bruce Messinger, the superintendent of the Helena School District at the time, the principal of the school, the fourth grade teachers, the parents, and the students, thirty-six students were asked to participate in this research. As a result, the parents of the corresponding students were asked to complete a parent survey on their child's behaviors and exposure to media at home. Participants were weeded out based on the non-return of permission slips. Twenty-one students and twenty parents participated in this research. Due to the fact that only student surveys that had an accompanying parent survey could be considered for this study, only twenty participants were included in the final research. The student surveys were administered in the classroom while the parent surveys were conducted over the phone. Parent phone numbers were provided by the parents as a part of the permission slips their children returned to the school. The distribution of the student surveys took place on October 6, 2011 and October 7, 2011 at 9:15 a.m. and 10:30 a.m. respectively. The distribution of the parent surveys took place from October 10, 2011 to October 20, 2011 at varying times between 10:00 a.m. and 8:00 p.m. based on parent request which was submitted as part of the parent permission slip. The students were asked to complete an ADHD-symptom checklist compiled from many different sources that offered examples of ADHD symptoms. This was completed in the classes. In order to do this, the surveys were read out loud to the students as they filled in the correct response. The parent survey, which was administered over the phone from a secure environment, was a behavior questionnaire that pertained to sleep habits, caffeine habits, television and movie habits, computer habits, iPod or other music device habits, and physical activity habits.

## **Conclusions from the Study**

The results of this initial study could be supported by a comprehensive study that would provide better analysis of the relationship between ADHD-like symptoms and behavior. With only twenty participants, it was difficult to see if any true relationship exists. The following is a brief outline of the results of the students whose questionnaires showed significant signs of ADHD-like symptoms as well as those who did not.

Out of twenty student participants, sixteen participants did not show significant signs of ADHD-like symptoms. This means that they selected the response “never” to questions more than five times and they selected the responses “often” and “very often” less than five times each. Because these students did not seem to show ADHD-like symptoms, their questionnaires were not compared to their parents’ responses.

Out of twenty student participants, four participants showed significant signs of ADHD-like symptoms. This means that they selected the response “never” to questions less than five times and they selected the responses “often” and “very often” more than five times each. The parent responses that showed significant trouble areas for their child’s behavior corresponded with three of the four student surveys in which ADHD-like symptoms were noticed.

Student 1’s ADHD-like symptoms were mostly related to trouble with focusing, making careless mistakes, being forgetful, and organization. This student had decent sleep habits and caffeine habits, but it is possible that this student’s responses related to his or her exposure to television, computer, and videogames during the weekends. This student spent 2-4 hours every weekend day on the television, the computer, and playing videogames—this would equate to 6-12 hours every weekend. This student also watched television in the 30 minutes before going to

bed on the weekend nights. The television programs and computer games this student watched and played were not educational.

Student 3's ADHD-like symptoms were mostly related to sustaining mental effort, blurting out answers, moving about too often, organization, and forgetfulness. This student received the recommended eight hours of sleep. This student's caffeine habit was higher than most of the other students', 1-3 glasses of soda per day is high when compared to the rest of the class. This student also watched television 2-4 hours a day during the school week and watched television every night before he or she fell asleep. The types of television programs and movies this student watched were violent and not educational.

Student 4's ADHD-like symptoms were mostly related to paying attention to details, blurting out answers, moving about too often, and fidgeting. Student 4 had decent sleep habits and caffeine habits. This student watched television between 6 and 8 hours per day during weekend days. This student also spent between 4 and 6 hours playing videogames on the weekend days. This means that during a typical weekend day this student was in front of a television screen between 10 and 14 hours out of the day. This would basically be from morning until night. This student did not watch educational television programs or play educational videogames.

Student 2's ADHD-like symptoms were mostly related to interrupting, difficulty maintaining attention span, and moving about too often. Student 2 had decent sleeping and caffeine habits. Student 2 did not watch an excessive amount of television. The only television programs this student watched were educational. Student 2 did not spend an excessive amount of time on the computer or playing videogames. When this student was on the computer, only educational games were played. Student 2 spends 4-6 hours playing outside on the weekends.

There was no real link between this student's ADHD-like symptoms and his or her behaviors at home.

The results of this survey show that a relationship between ADHD-like symptoms and behavior were present for three out of four students who reported ADHD-like symptoms. These students selected the response "never" to questions less than five times and they selected the responses "often" and "very often" more than five times each. The parent responses that showed significant trouble areas for their child's behavior corresponded with three of the four student surveys in which ADHD-like symptoms were noticed.

### **Variables that May have Caused Results**

Multiple limitations may have skewed the results of this study.

1. Number of participants. In order to conduct a more thorough study, more students and parents should have participated. Ideally, fifty students would have participated in the study. Because only twenty students and their parents participated, the results of this study were somewhat inconclusive.
2. Student honesty. Before the survey was administered to students, a prompt was read that stated "I will be the only person to see their direct responses to the questionnaire and that you will not be penalized or rewarded for your answers. There is no right or wrong answer, the correct response is the response that you personally identify with the most. When this study is completed, I will destroy the copies of your answers. Please be completely honest with your answers. I will not show your answers to your teacher; you do not need to tell anyone your answers. It is okay to refuse to answer if one of your friends asks you what you put as your answers. Remember to please be as honest as

possible.” Although this prompt was read, some students may not have answered honestly.

3. Student Reliability. It is not known if the students’ answers were reliable. Reliability of student answers would mean that the participants would answer the survey the same way every time the survey is taken, not dependent on the day or time the survey is taken. In order to test this, students would need to be re-tested another time so that answers from both surveys could be compared.
4. The amount of time spent taking the survey. To administer student surveys, the questionnaire was read out loud to the students. It is possible that the survey was read too quickly. Some students may have fallen behind the group and as a result had trouble focusing on the question being read. If students did not understand the vocabulary in the statement or made a reading error while trying to catch up, their answers may have been skewed.
5. Parent uncertainty. Many parents stated that their child lived in a different household during the weekends and therefore they were unsure of exactly how their child spent his or her time on the weekends. These parents responded to questions regarding weekend days with guesses of their child’s behavior. Had both households involved been interviewed, the results would be more accurate. Also, many parents were unsure of their answers and needed to ask their child the question. Many children were home and told their parents the correct response. Had these children not been home, more parents would have been forced to select “I don’t know” as their answer.
6. Specificity of parent questionnaires. Many parents gave specific answers to the questions that asked them to answer with a range of hours. For example, if a parent stated one hour



as his or her response, the range 0-2 hours was selected. If the parent questionnaires allowed parents to give specific answers rather than a range, the results would be more specific, and therefore more accurate.

7. Origin of relationship. When conducting this study, it was difficult to decide whether a student's behavior affected his or her proneness to ADHD-like symptoms. Many other factors could be responsible for producing or restricting ADHD-like symptoms.

All of these variables could have made a difference in how the children or parents responded to the questionnaires.

### **Suggestions for Further Study**

This study, if conducted more in-depth could provide helpful information to school officials, students, and parents. Future studies examining the relationship between a child's behavior and ADHD might include the following dimensions.

1. Each student participant ought to be monitored more closely at home and at school by a non-biased person. If students were monitored by a non-biased person and not required to self-evaluate themselves for symptoms, it is likely results would be more accurate. If parents were not required to monitor their child's behavior, and students were observed at home by a non-biased person, more specific results would be found.
2. This study should be conducted for a period of at least six months. In order to be diagnosed with ADHD, symptoms must occur frequently for a period of six months. By monitoring students in two different settings, the school and the home, the results of the study would be closer to resembling an actual diagnosis of ADHD. No real diagnosis of this disorder is possible to achieve by conducting this study.

This study has provided results that are worth consideration. In order to reach a more accurate conclusion about the relationship between behavior and ADHD-like symptoms, further studies must be conducted. By conducting more studies on this topic, many people including parents, teachers, principals, and children with and without ADHD could gain valuable information regarding behavior management and ADHD.

### **Summary**

Differentiated instruction is popular in many classrooms today. In every classroom students are all different from one another. Educators already differentiate instruction to reach students with special needs as well as students who are proficient at grade level. Teachers must adapt their teaching styles to accommodate students with special needs. If making adjustments to teaching styles so that the behaviors of students changed slightly in a way that reduced ADHD-like symptoms in all of the children in a classroom, hopefully most teachers would make these simple adjustments. If by permitting a student to sit on an exercise ball that allowed the student to fidget when necessary or by allowing students to move freely about the classroom without being reprimanded the student's ADHD-like behaviors could be reduced, many teachers would be willing to make these changes.

As more children are diagnosed with ADHD, it is possible that there are social problems causing this disorder to increase in occurrence. Is this society too focused on technology such as television and videogames? Is it too wrapped up in a fast paced life-style that it is impossible to find time to sit down and read to children? Daily life ought to slow down for students so that they have time to enjoy learning.

It was the goal in this thesis to explore a relationship between poor sleep habits, too much caffeine, too much television, too many videogames and computer games, and not enough

physical activity and ADHD-like symptoms. Through the study conducted in two fourth grade classes in Helena, Montana it was concluded that a child's behavior may possibly affect ADHD-like symptoms. The results of this survey show that a relationship between ADHD-like symptoms and behavior were present for three out of four students who reported ADHD-like symptoms. These students selected the response "never" to questions less than five times and they selected the responses "often" and "very often" more than five times each. The parent responses that showed significant trouble areas for their child's behavior corresponded with three of the four student surveys in which ADHD-like symptoms were noticed.

Results from further studies might benefit all children, parents, and school officials. Although this thesis did not find a set answer to its initial question, it showed that no two students are exactly alike. This is an important lesson for teachers to learn—the classroom should morph so that each student feels comfortable in it until they find success.

## **Appendix A**

### **Student Questionnaire**

**STUDENT NAME** \_\_\_\_\_

**DATE** \_\_\_\_\_

	Never	Sometimes	Often	Very Often
I fail to pay close attention to details or I make careless mistakes in schoolwork, work, or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have difficulty keeping my attention on tasks or play activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not listen when someone is talking to me directly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not follow instructions and fail to finish my schoolwork, chores, or duties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have difficulty organizing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I avoid, dislike, or am unwilling to engage in tasks that require sustained mental effort (such as homework)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I loses thing that are necessary for tasks or activities (toys, school assignments, pencils, books, or tools)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am easily distracted by outside stimuli	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am forgetful in daily activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Never	Sometimes	Often	Very Often
I fidgets with my hands or feet or I squirm in my seat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I leave my seat in the classroom or in other situations in which I am supposed to remain seated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I run or walk about or climb too much in situations in which it is inappropriate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have trouble being quiet in class even if I am told to limit my conversation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I move around too much in the classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I talk too much in class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Never	Sometimes	Often	Very Often
I blurt out answers before questions have been completed or when someone else is talking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have trouble waiting my turn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I interrupt or intrude on others (such as butting into conversations or games)	<input type="radio"/>	<input type="radio"/>		

## **Appendix B**

### **Parent Questionnaire**

**PARENT QUESTIONNAIRE**

NAME \_\_\_\_\_

CHILD'S NAME \_\_\_\_\_

1. What time does your child usually go to bed on school nights?  
Range: \_\_\_\_\_ am/pm to \_\_\_\_\_ am/pm
2. What is the main reason your child goes to bed at a particular time? (Check one below)

Because it fits best with the family's schedule \_\_\_\_\_  
Because she/he feels sleepy then \_\_\_\_\_  
Because that is when her/his TV shows are over \_\_\_\_\_  
Because that is when her/his brothers and sisters go to bed \_\_\_\_\_  
To "get enough sleep" for the following day's activities \_\_\_\_\_  
Other (describe briefly) \_\_\_\_\_

3. What time does your child usually wake up on school day mornings?  
Range: \_\_\_\_\_ am/pm to \_\_\_\_\_ am/pm

4. What usually wakes up your child in the mornings on school days? (Check one below)

Alarm clock \_\_\_\_\_  
Needs to go to the bathroom \_\_\_\_\_  
Parent of other family member \_\_\_\_\_  
Spontaneous \_\_\_\_\_  
Noise \_\_\_\_\_  
Other (describe briefly) \_\_\_\_\_

5. How much caffeinated soda did your child drink? (Circle one below)

More than 3 glasses per day  
Between 1 and 3 glasses per day  
Less than one glass per day  
None  
Don't know

6. How much television and/or videos did your child watch on school days? (Circle one below)

0-2 hours per day  
Between 2 and 4 hours  
Between 4 and 6 hours  
Between 6 and 8 hours  
More than 8 hours  
Don't know



7. How much television and/or videos did your child watch on weekend days? (Circle one below)

0-2 hours per day  
Between 2 and 4 hours  
Between 4 and 6 hours  
Between 6 and 8 hours  
More than 8 hours  
Don't know

8. Does your child have a television set in his/her bedroom? (Circle one) Yes No

9. Does your child watch TV and/or videos in the 30 minutes before falling asleep? (Circle one below)

Every night  
5-6 nights  
3-4 nights  
1-2 nights  
Not at all

10. How much time does your child spend on the computer on school days? (Circle one below)

0-2 hours per day  
Between 2 and 4 hours  
Between 4 and 6 hours  
Between 6 and 8 hours  
More than 8 hours  
Don't know

11. How much time does your child spend on the computer on weekend days? (Circle one below)

0-2 hours per day  
Between 2 and 4 hours  
Between 4 and 6 hours  
Between 6 and 8 hours  
More than 8 hours  
Don't know

**12.** How many hours does your child spend listening to an iPod or other music devices on school days? (Circle one below)

- 0-2 hours per day
- Between 2 and 4 hours
- Between 4 and 6 hours
- Between 6 and 8 hours
- More than 8 hours
- Don't know

**13.** How many hours does your child spend listening to an iPod or other music devices on weekend days? (Circle one below)

- 0-2 hours per day
- Between 2 and 4 hours
- Between 4 and 6 hours
- Between 6 and 8 hours
- More than 8 hours
- Don't know

**14.** How many hours does your child spend playing video games on school days? (Circle one below)

- 0-2 hours per day
- Between 2 and 4 hours
- Between 4 and 6 hours
- Between 6 and 8 hours
- More than 8 hours
- Don't know

**15.** How many hours does your child spend playing video games on weekend days? (Circle one below)

- 0-2 hours per day
- Between 2 and 4 hours
- Between 4 and 6 hours
- Between 6 and 8 hours
- More than 8 hours
- Don't know

**16.** How many hours does your child spend playing outside with peers or by him/herself or participating in physical activities such as a sport on a school day? (Circle one below)

- 0-2 hours per day
- Between 2 and 4 hours
- Between 4 and 6 hours
- Between 6 and 8 hours
- More than 8 hours
- Don't know

**17.** How many hours does your child spend playing outside with peers or by him/herself or participating in physical activities such as a sport on a weekend day? (Circle one below)

- 0-2 hours per day
- Between 2 and 4 hours
- Between 4 and 6 hours
- Between 6 and 8 hours
- More than 8 hours
- Don't know

**18.** What types of television shows does your child typically watch? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Are these television shows interactive? Yes No

**19.** What types of computer/video games does your child typically play?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Are these games interactive? Yes No

## **Appendix C**

### **Parent Comments**

*These parent comments appear in no particular order. The letters of the outline do not correspond to specific parents' answers; comment a under question 2 was not necessarily said by the same person who's comment is listed as comment a under question 3 and so on and so forth.*

1. What time does your child usually go to bed on school nights?
  - a. No Comments.
  
2. What is the main reason your child goes to bed at a particular time?
  - a. We have to follow a routine.
  - b. She does this for her health.
  - c. To be well rested.
  - d. This is what we agreed on.
  - e. Dance class is over at 8.
  - f. Too grumpy after 9 p.m.
  
3. What time does your child usually wake up on school day mornings?
  - a. No Comments.
  
4. What usually wakes up your child in the mornings on school days?
  - a. Our dog.
  - b. My child is autistic.
  
5. How much caffeinated soda does your child drink?
  - a. Has a few glasses once in a while.
  - b. Will only have a glass on a weekend.
  
6. How much television and/or videos does your child watch on school days?
  - a. No Comments.
  
7. How much television and/or videos does your child watch on the weekend days?
  - a. We watch family movies.
  - b. I don't know, he is always with his dad.
  
8. Does your child have a television set in his/her bedroom?
  - a. No Comments.
  
9. Does your child watch TV and/ or videos in the 30 minutes before falling asleep?
  - a. Will only do this on weekends though.

10. How much time does your child spend on the computer on school days?
  - a. Only uses a computer to finish homework.
  - b. Only the time she is on one at school.
  - c. Only uses one to finish homework.
  - d. Only the time he is at school.
11. How much time does your child spend on the computer on weekend days?
  - a. I don't know, he is always with his dad.
12. How many hours does your child spend listening to an iPod or other music devices on school days?
  - a. My child hates music.
  - b. Our radio is on from the minute we wake up to the minute we go to sleep. So is our TV.
13. How many hours does your child spend listening to an iPod or other music devices on weekend days?
  - a. No Comments.
14. How many hours does your child spend playing videogames on school days?
  - a. No Comments.
15. How many hours does your child spend playing videogames on weekend days?
  - a. It depends on where she is. She watches more at her dad's house.
  - b. This always varies.
16. How many hours does your child spend playing outside either with peers or alone, or participating in physical activities such as sports on a school day?
  - a. It all depends on weather.
  - b. Sometimes we will play outside with the little kids.
17. How many hours does your child spend playing outside either with peers or alone, or participating in physical activities such as sports on a weekend day?
  - a. It depends on weather.
  - b. Will play more games if there are tournaments.
  - c. Sometimes he is on the computer all weekend long and sometimes we go out on a boat or on four wheelers.
18. What types of television shows does your child typically watch? Are they interactive?
  - a. Cartoons, iCarly

- b. Netflix only, don't have cable TV. Disney shows or Power Rangers.
- c. Cartoons or football.
- d. Nickelodeon
- e. Disney Channel
- f. Sometimes Discovery or the History Channel.
- g. History or Animal Channel.
- h. Reality TV shows like the Biggest Loser or Survivor.
- i. The learning channel or ABC Family.
- j. Kids movies.
- k. Horror Movies.
- l. My child never watches TV.
- m. We don't have cable TV.

\*The Disney Channel, Cartoons, and Nickelodeon were repeated several times from several different parents.

19. What types of computer/videogames does your child typically play?

- a. Barbie, Girl-Go Games. Not educational.
- b. Cartoons
- c. Sims 3, Minecraft.
- d. Plays games on a DS, not educational.
- e. Mazes, not educational games.
- f. Wii Fit.
- g. Math games or Spelling ones.
- h. Webkins.
- i. School projects, Facebook, email.
- j. PBS or Cool math games. All educational.
- k. Nick Jr. Website.
- l. Educational games like JumpStart.
- m. War Games
- n. Pop Tropica
- o. We don't have a computer.
- p. Playstation 2.

\*Wii Fit games were mentioned several times by several different parents.

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