

Exploring Strategies for Anxiety Management in Autism Spectrum Disorder Students through Physical Activity

**Coreen Dutka
Saskatoon Public School Division**

**Brenda Kalyn
University of Saskatchewan**

This practical classroom inquiry describes the process and outcomes of implementing a daily routine of physical activity for high school students with Autism Spectrum Disorder (ASD) as a pedagogical strategy for the management and regulation of anxiety and to enhance self-regulation. Students maintained simple activity records paying attention to personal, physical, emotional, and cognitive aspects of 'self'. Regulation was primarily concerned with students' behaviors and the ability to self-control impulses, cease unwelcomed behaviors, and move towards more acceptable behaviors (autism.net, 2015). Positive effects of this movement intervention demonstrated less student anxiety, improved focus, improved communication, and decreased perseverating activities.

I AM A TEACHER OF ASD STUDENTS

He was spinning a pencil on the tabletop. The bell signaling the start to a new school day did not seem to break the intensity of his fixation. The pencil moved like an orange pinwheel. There were shadows of people and muffled voices...the routine of a high school day had begun. For my students with Autism Spectrum Disorders (ASD), social interactions are difficult and communication, both receptive and expressive, can be difficult. The sensory deficits experienced by many students with ASD are amplified as soon as they enter school. They experience too many voices, too many demands, too many sounds, and too many smells.

Some students require constant movement in order to manage anxiety while others seem to simply power down in order to shut out the sensory information that they cannot manage. Shutting down behaviors manifest by withholding communication, becoming argumentative or getting stuck in rigid thought patterns. Still others may "stim" which is a common behavior in people with ASD referring to repetitive body movements or repetitive movement of objects such as walking in repetitive patterns, hand wringing, or picking at one's skin (Edelson, 2016). Too much noise, too much or too little light, too much activity, or too many tasks to manage are all variables that may contribute to youth with ASD being in an unregulated state. These youth are almost always in a state of anxiousness or heightened arousal.

Most of my students with High Functioning Autism (HFA) struggle to fit in or to know the appropriate thing to say, or not to say, at the appropriate time. They describe the feeling of being out of control, disorganized, feeling weird or not quite right. Reciprocal socialization is difficult. These students have grown used to sitting out on the periphery of most social and organizational activities because of

their exceptionalities. They struggle with anxiety that manifests itself through a host of problems that they encounter during the day. As a result of unmanaged anxiety, students with ASD may exhibit increased agitation, display lack of communication, or engage in refusal behaviors. Non-compliance with activities such as attending class, completing class work, or adhering to class routines with peers are apparent when youth with ASD are in an unregulated state or, more specifically, lack the ability to control their own behavior and behave properly even when they do not feel like it. Self-regulation is described as "...the ability to monitor and control our own behavior, emotions, or thoughts, altering them in accordance with the demands of the situation". www.education.com/reference/article/self-regulation-development-skill/

Experts in the field of autism noted that one of the hallmark features of autism is anxiety. Temple Grandin (2006), Professor at Colorado State University has ASD and shared her experiences with anxiety:

Puberty arrived when I was fourteen, and nerve attacks accompanied it. I started living in a constant state of stage fright, the way you feel before your first big job interview or public speaking engagement. But in my case, the anxiety seized me for no good reason. Many people with autism find that the symptoms worsen at puberty. When my anxiety went away, it was replaced with bouts of colitis or terrible headaches. My nervous system was constantly under stress. I was like a frightened animal, and every little thing triggered a fear reaction. (p. 123)

Each of my students has been diagnosed with a form of autism called Asperger's Syndrome; more commonly referred to as ASD (Autism Spectrum Disorder) due to the wide spectrum of characteristics this disorder can encompass. In my classroom, I have the same challenges and responsibilities as any other teacher to engage, enlighten, and educate my students. However, my students require me to be extra sensitive and responsive to their particular needs. I strive to be attentive and observant to their needs and enhance the learning environment to improve learning and their general well-being. I work daily to understand my students and to get to know them and how they are feeling. As their teacher, I wondered how I could assist them in dealing more effectively with their anxiety.

The benefits of exercise on a person's well-being kept surfacing in my mind. Personal experience with exercise and recognizing the benefits of daily exercise routines, combined with the literature on exercise and behavior led me to implement a daily exercise routine within my resource room period. The goal was to learn if the exercise routines could help to decrease student anxiety and contribute to a more productive learning experience for my students. This classroom inquiry provided insight into their experiences and reactions to the exercise routines, my observations, and subsequent student behaviors as a result.

LITERATURE

Studies as indicated in this review have shown that when youth with ASD participate in a routine physical fitness program, a number of positive changes occur. Their anxiety appears to diminish, there are fewer behavioral challenges, they are more inclined to socialize in a meaningful way with their peers while exercising and they appear more likely to engage in seat-work for at least 30–45 minutes post exercise. And all of this while becoming stronger, developing better core muscle strength, and improving fine and gross motor skills.

Cameron (2011) found that implementing 20 minutes of cardio exercise at target heart rate prior to academic work had a significant effect on student behaviors and learning outcomes. Students prior to this program who had a variety of challenges from AFS, ASD, ADD, were unable to sit in their desks, stay awake, or desist from deviant behaviors for any length of time to accomplish learning. Engagement in the exercise program produced positive changes in her students' behaviors, improved their concentration and self-confidence levels, and enhanced their attitudes towards life.

Ratey (2008) claimed "...exercise increases levels of serotonin, norepinephrine, and dopamine – important neurotransmitters that traffic in thoughts and emotions" (p. 5). He explained that when these neurotransmitters are activated, they act as regulators for the brain, thereby decreasing the "noise" in the brain (p. 37). He further described the benefits of daily physical exercise (30-45 minutes of aerobic

exercise -3 times per week) as “...an unparalleled stimulus, creating an environment in which the brain is ready, willing, and able to learn” (p. 10). He goes on to say that exercise benefits the brain by “...providing a welcome distraction from anxiety, reducing muscle tension, building brain resources, teaching the brain a different outcome, rerouting brain circuitry, improving resilience, and setting you free” (p. 106-108).

The best way to improve neural firing and improve synaptic brain connection may be through exercise. Ashbruner, Rodger, Ziviani, and Hinder (2014) stated “programming for ASD should be based on accommodation and self-regulation for sensory differences” (p. 29). The challenge for people with ASD occurs when there is a mismatch between the processing of sensory input and the environmental demands. Ashbruner et al., (2014) found that in sensory motor activities are “powerful mediators of neural plasticity, capable of sharpening brain development, therefore changing the way the nervous system processes sensory input” (p. 30).

Potvin, Snider, Prelock, Kehayia, and Wood-Dauphinee (2012) indicated that the amount of physical activity children with ASD participate in was low and their activities mostly involved video games. Some unique exercise programs support the theory that when children and youth with intellectual exceptionalities are involved in a regular exercise program, they are not only physically stronger and act more socially appropriate, they are also able to self-regulate in order to minimize anxiety and unexpected behaviors.

Clapham, Armitano, Lamont, and Audette (2014) looked at the ocean as a therapeutic environment for children with disabilities. The program offered a combination of surfing and aquatics to children with autism, as well as a variety of other children with physical and intellectual disabilities. Children with autism showed a decrease in stereotypical movements such as spinning, swinging, and delayed echolalia (repetition of words or phrases) as well as improved strength, flexibility, range of motion, coordination, balance, and psychosocial development. Youth with ASD participated in Pranayama Yoga that focused on “chittavrittinirodha” or “cessation of the fluctuation of the mind” (Singh & Singh, 2013, p. 274). Participants were observed with a peg board activity pre and post yoga exercise and were found to have more physical coordination, grip strength and dexterity after participating in yoga for an extended period of time as well as improved mental clarity, self-efficiency, creativity, concentration, and memory. The researchers claimed this mental and physical improvement was due to the unique breathing exercises that are required in this form of yoga that “energize vital organs” and “help students manage anxiety, stress, and impulsivity” (p. 277).

Hilton, Cumpata, Klohr, Gaetke, Artner, Johnson, and Dobbs (2014) looked at the development of executive function in youth with ASD and designed an “exergaming” activity to study the impact of a light and sound speed based exergame on the brain’s executive function to learn if it would improve after participating in this game. Data showed that after youth with ASD participated in the exergame Makoto Arena (Exergame Fitness, 2011), they had improved working memory, attention increased, and repetitive behaviors were decreased. The executive function area of our brains assists with our working memory, mental flexibility, response initiation and inhibition, impulse control, and the monitoring of an action. A typically developed executive function also helps people persevere in challenging situations, recognize and deal with unexpected situations, and make alternative plans quickly, as well as aids in the inhibition of inappropriate behaviors (Hilton et al., 2014). These executive function responsibilities are absent or underdeveloped in people with ASD. It is encouraging, based on these studies, that when youth with ASD participated in some form of rigorous aerobic exercise, their attention and memory improved as well as there was an observed reduction in perseverative and socially disruptive behaviors

It is necessary to understand the common motor sensory challenges that young people with ASD experience. Bilimoria (2014) stated, “ASD has three hallmark features...impaired social interaction, communication difficulties, and repetitive behaviors” (p. 1). She described the autistic brain:

The affected gene makes MeCP2, a protein that dims the activity of many genes in nerve cells that influence synapse formation or function. The absence of MeCP2 causes dendrites, tree-like structures on neurons that receive incoming messages, to contain fewer spines, or spots for synapses to grow. The synapses that do develop do not function normally. (p. 1)

The best way to improve the neural firing and improve synaptic connection may be through exercise. Past research by Ashbruner et al. (2014) stated that, "Programming for ASD should be based on accommodation and self-regulation for sensory differences" (p. 29) and found that sensory motor activities are "powerful mediators of neural plasticity, capable of sharpening brain development, therefore changing the way the nervous system processes sensory input" (p. 30). The challenge for people with ASD occurs when there is a mismatch between the processing of sensory input and the environmental demands.

Moskowitz, Mulder, Walsh, McLaughlin, Zarcone, Proudfit, & Carr (2013) looked at behavioral data from three school-aged children with ASD ranging in age from six through nine. The focus of this study was to determine what behaviors accompanied anxiousness (anxiety) in children with ASD and the physiological factors experienced by the children once in a measured state of anxiety. It was found that accelerated heart rate and respiration along with pupil dilation accompanied a heightened state of anxiousness, which included behaviors such as irritability, tenseness, agitation, crying, or withdrawal. Interestingly, this study measured the resting heart rate of participants while not experiencing anxiety as well as the heart rate of those same participants as they were experiencing mild to moderate amounts of stress or anxiety. The authors stated:

Thus, it is plausible that anxiety may be causally or functionally related to problem behavior in many children with ASD, in that they engage in problem behavior to reduce their anxiety by escaping/avoiding an anxiety-provoking situation and/or by seeking reassurance, comfort, or self-soothing stimuli such as self-stimulation that may be seen in repetitive behaviors such as pacing, hand-wringing, or cessation of communication. (p. 420)

Since students with ASD are often in a state of anxiousness or heightened arousal, the literature suggests that exercise has a positive impact on the well-being of students with ASD and assists with the negative effects of anxiety.

Unfortunately, Rutkowski and Brimer (2014) indicated youth with ASD experience an overwhelmingly negative response to physical education class in school. Some negative experiences of young people with ASD involve motor skill deficits, varying degrees of impaired communication and language development, poor socialization skills, and repetitive behaviors and interests. This study suggested that improvements could be made in program delivery such as providing more non-verbal cues, improved social contacts, and adherence to rules and routines to enhance a variety of daily living activities for students.

Kalyn, Paslawski, Wilson, Kikcio, & MacPhedran (2007); Cameron (2011) demonstrated that students who were engaged in more physical activity inside of their academic day experienced no negative impact on learning outcomes and in-fact served to improve behaviors and learning. Participating in physical activity is a valuable part of an individual's day leading to enhanced health and wellness. We know the overall benefits. Why then should we not strive for the same positive outcomes for students with ASD? As educators we need to continue to be inspired by our students and challenge our pedagogies to improve their lives. This classroom inquiry, in my high-school resource room with my students, was the impetus for supporting the physical, emotional, social, and cognitive needs of ASD students struggling with anxiety disorders and regulation challenges through physical activity.

SETTING UP THE CLASSROOM INQUIRY

Implementing a specific, personal, and self-regulating routine to help my students decrease their anxiety through exercise and contribute to a more productive learning experience for them, aligned with the literature and studies that have laid the groundwork for this inquiry.

Taking into account the literature, my personal teaching experiences, observations of my students over many years, and personally reaping the benefits of consistent physical activity, I became increasingly interested in implementing a component of daily physical activity for my ASD students. A graduate class I was taking at the time focused on classroom inquiry and provided the impetus for implementing the inquiry and exploring if physical movement in a variety of forms may be a useful strategy for the

management of anxiety in high-functioning autistic youth. As the resource room teacher, I developed and implemented an exploratory program to engage my students in physical activity to learn if the students would benefit from the activities and determine further regulation strategies.

The Routine: Keeping it Simple!

The inquiry participants were six male students ranging in age from 14 to 19 who have been formally diagnosed with autism spectrum disorder (ASD) and are currently enrolled in the Autism/Asperger’s Resource Room at one urban high-school. The male component was not a design; rather it was a function of the class since there were no female students at that time. As part of their regular school day these students participated in a 60-minute Resource Room class in which there was an expectation for students to participate in some form of physical activity for 15 minutes at the beginning of each class.

Appealing to the students’ intellect and based on Ratey’s work (2008), I shared a power-point with the students outlining what regulation was and the impact that exercise could have on them. As well, pictures of the exercises were presented and information about the brain and brain chemicals were provided to demonstrate to the students how exercise affects the physical, social, and emotional sense of well-being.






Students were asked to determine their personal state of regulation before class from the pictured emoticons in the figure below. After a selected activity, they were asked to record their state of regulation a second time using the same figure.

**FIGURE 1
PERSONAL STATE OF REGULATION**






Regulation Worksheet

Name: _____

What is your level of regulation before exercise?

1	2	3	4	5
				

What is your level of regulation after you exercise?

1	2	3	4	5
				

Record your activity below:

Cardio	Time:	Strength	Reps./ Kg:	Core	Time:
Treadmill		Lats		Yoga	
Elliptical		Chest		Wall Sit	
Cycle		Arms		Plank	
Walk		Legs		Sit-ups	

Resting Heart Rate: _____

Heart Rate after Work-Out: _____

Students determined what type of exercise they would participate in once they reached the weight room. They were encouraged to engage in different activities of their choosing each day. Their 15-minute activity choices for each day included:

1. Cardio – choices were the treadmill, elliptical, or stationary bicycle. When the weather cooperated many favored a walk outside. Either myself, an EA (educational assistant) or another resource room staff member would accompany the student. The key was that the exercise must be sustained for 15 minutes at an elevated heart-rate level.
2. Strength – this included at least 5 of the weight bearing machines such as seated row, chest press, chest fly, lat pull down, quad lift, squats, or free weights. Students recorded the 5 machines they used in sets and reps (i.e. 2 sets/10 reps each)
3. Core – this activity included any combination of planks, wall sits, yoga, heavy ball work, sit-ups, crunches, or mountain climbers.

Students measured and recorded their resting heart rate with a heart rate monitor before and again after the exercise. Students then took part in the regulation activity for at least 15 minutes. Upon returning to the Resource Room, students recorded their exercise or physical movement activity, the duration of the activity, and or the number of reps for each activity if using weights. Students identified on the record keeping sheet their level of regulation (1 – 5) that they felt they were experiencing post activity on Figure 1. This was recorded for one week at a time before sheets were collected.

The key for me as their teacher was listening to the students' self-assessments and learning the processes they went through to reach their decisions about their state of regulation. The following is a list of the guiding/prompting questions students were asked during their participation in an exercise program in the Autism/Asperger's Resource Room. These questions were purposeful in providing insight into student's thinking as well as to inform my practice:

1. What does the term self-regulation mean to you?
2. What do you think a person who is "regulated" behaves like? What would a regulated person say or do to show that they are regulated?
3. How do you feel on a regular day when you arrive at school:
 - a. Before you exercise?
 - b. After you exercise?
4. Describe how it feels when you are anxious.
5. What are some things that you might do when you feel anxiety or anxiousness?
6. Describe your favorite exercise. Explain why it is your favorite.
7. What is your least favorite exercise? Explain why it is your least favorite.

The idea of “keeping it simple” was evident throughout the actual exercise time. While students were focused on doing the exercise, I was most interested in their thought processes while they were exercising. My intention was to try to ensure that the students were experiencing an awareness, or a sense of how they were feeling generally, as a result of their exercise. Through observations, conversations with them, and asking them questions, I was present for their experiences and intentionally trying to keep them focused on their feelings and experiences. I used this exercise time to talk about their lives and their interests, and act as a cheerleader and motivator as I monitored their progress. I observed a particular young man who could run on the treadmill and during that exercise, talk more than he ever would in the classroom or to his peers in a typical social setting. I could literally see him experiencing expected social behavior while expressing his thoughts and ideas, all while exercising.

At times, some of my students would ask, “Why do we have to do this exercise anyway?” This question would come up every few weeks and it was always addressed. Exercising was difficult for some of the students and not a comfortable or favored activity. However, I would remind them of the advantages of exercise and point out their improvements and send a supportive comment about how fit they were looking, or how much they could lift would help to put them back on track. Students with ASD typically crave routine and exercising at the beginning of each Resource Class was the expected routine. For example, students at our school are expected to rise for the daily playing of “O, Canada” and do not question that as expected behavior, so too they were also instructed that they were expected to participate in the regulation activity during their Resource Class. There were those times when some students questioned the routine. They were reminded of the importance of routine as a time to regulate, focus, and connect with peers and above all pay attention to themselves and how they were feeling.

Teacher’s Observations

Observations of my students before, during, and after the exercise included: (a) an observable level of anxiety before regulation activity; (b) engagement in the physical movement activity; (c) varied levels of response to the activity; and (d) their ability to regulate and focus on academic pursuits post regulation activity. Conversations and invitations to monitor their perceived levels of regulation, engagement, and feelings were conducted with all participants to determine their perceptions of personal anxiety levels and how physical movement may have increased their productivity. The questions asked were used primarily to cue students back to their state of regulation (i.e. state of readiness and focus for transitioning to seat work or levels of anxiety or communication).

The information collected from this inquiry was analyzed based on the themes, patterns, observations, and categories students spoke about. A thematic pattern emerged in terms of: 1) students’ improved socialization with peers and adults; 2) more effective emotional regulation; 3) self-identified feelings of being more regulated after their activity. Sub-themes such as a sense of well-being, increased responsibility and suppression of behavioral outbursts were also observed. Each student determined their own personal self-regulation and determined if they experienced an increase in focus, control, and a decrease in behavioral outbursts. Parental and/or guardian consent for participation was collected prior to the inquiry beginning. Because this inquiry was dependent on the participants being identified on the autism spectrum, the selection process was non-randomized.

Part of the mandate that I have as a resource room teacher is to help my students try to understand their experiences and how they might affect change to keep those experiences positive. Self-regulation is something we all encounter every day. My students’ needs are no different; however, I wanted to provide them with as many tools as possible to achieve lower levels of anxiety and assist them in reaching positive behavioral and social outcomes.

PEDAGOGICAL OBSERVATIONS AND LESSONS LEARNED

In exchange for these 15 minutes of physical activity, instead of battling anxiety, experiencing a lack of focus, perseverations, and communication deficits; these youth on the spectrum were more focused and ready to work. Some students still experienced challenges with focus, alertness, and anxiety management,

but overall students were more willing to problem solve and their communication strategies were more effective after their exercise sessions. They were more willing to verbalize requests instead of acting out a negative behavior in order to communicate and their state of mental health and physical health improved. Student engagement in the physical regulation activities was high and motivation to participate in this program continued. Students began to “feel” differently after they exercised and expressed their experiences and feelings.

One of the favorite things to hear from my students upon returning to the classroom after our “work out” (yes, I do it too!) was, “Now, I have some work to do”! In the ten years that I have taught in this program, I have seen first-hand how a regular routine of physical exercise (regulation) for at least 15 minutes each day helped to stabilize and support my student with ASD so that they could focus on their studies, as well as make improvements to their social conduct in a variety of settings. The most rewarding observation was how my students appeared to have less anxiety.

The students were also beginning to make connections between exercise, their learning, and how they felt. Recently, I asked my Grade 9 class, “Why do you think we go to the weight room to help you regulate every day?” One student remarked, “It’s so that we can think better...” I coached, “...and...what else?” The same student responded, “It floods our brains with that good hormone...” That good hormone is dopamine. The routine that I established in the classroom had made a connection. Students were now able to equate “that good feeling” with an activity.

Students were able to retain focus after their workout session for sustained periods during our Resource Class and transfer that same focus into the energy required to complete their assignments. However, that same, regulated student goes to three more classes during the day and I wondered if the student maintained that same stamina throughout their day. I wondered if the students transferred the regulation strategies from one setting to another? Students with HFA do not always transfer learned information from one setting to another in a fluid manner. It is difficult for many of my students to recall what worked in one setting and recognize that it might also work in another.

I found that students seemed to need to return to a “home base” (or Resource Class) in order to remind themselves of their regulated state of mind. For instance, one of my students was having a difficult time finding the internal reserves to complete a history assignment so his teacher brought him to the Resource room to talk. I was able to remind him of that “regulated state” and how it felt, and even though he did not apply any kind of movement strategy, he was able to return to a calm state and utilize a somatic marker (or emotional connection) to the regulated state. Our conversation went something like this, “Remember your worries about what is happening at home right now? Now, try to leave them with me, what would that feel like?” “Now, try to think about how you felt during our exercise session this morning? If you can bring those same feelings to mind right now, you will be able to focus on history.” My hope was that if I could encourage this student to retrieve the sense of what his body felt like in our earlier regulation session, and transfer that feeling to a new setting he would be able to apply internal regulation to an external problem.

Although this inquiry did not garner any sophisticated physiological measurements, there is a professional piece that teachers contribute to within their pedagogical practice on a daily basis through the observations of their students and their programs. Teachers observe what is working in their classrooms, question what is missing, and investigate further practices that are required to affect positive, personal, and academic outcomes for students. These pieces of professional practice that teachers bring to active pedagogy are integral acts that teachers engage in to inform their practice and enhance the student’s learning experiences.

Physical activity for the development and maintenance of overall health for students with ASD should continue to be explored and implemented by teachers within their classrooms. Extended programs such as Teen Club, run by our local Autism Services (www.autismservices.ca) in which teens go bowling, participate in weightlifting, or have gaming nights could grow and flourish with further inquiry into the benefits of physical exercise on self-regulation and sensory management. Those who work with ASD youth need to be observant and pay attention to positive outcomes from exercise and other forms of physical activity. Adaptations to the environment in which youth with ASD are required to participate in

physical activity could be explored. Embedding sensory input within daily routines to modulate arousal and extend the benefits of physical activity from the workout room to the classroom is important. Further inquiry into the ways in which to develop appropriate arousal states in youth with ASD is key to promoting success in academic pursuits. Youth with ASD should have several self-regulation strategies to choose from and utilize when they are either under or over aroused by sensory input. Self-identification of these arousal states is also an area of future inquiry and possibilities. We need to believe in the capabilities of our students and enhance their learning through a variety of contexts.

Our Classroom, Our Tomorrow

As a teacher of students with ASD, I will continue to implement a 15-minute exercise routine into my daily practice due to the overwhelmingly positive benefits I have observed with my students throughout this inquiry. The students learned to expect and anticipate the exercise routine that not only facilitated their self-regulation, but also aided in the students' individual fitness levels and increased their stamina. The simple routines they were engaged in appeared to facilitate decreased anxiety levels for my students. These sessions became a therapeutic time for me to talk to students one on one and help them work through some personal problems. During our exercise routines we had conversations about their challenges such as simple daily routines, getting up in the morning, difficulty with relationships, or discussions about things that interested them. These wonderful, spontaneous conversations helped me understand them better and built on our trusted relationships.

I learned the value of modeling the exercise routine and that doing the exercises right along with the students made me feel better too! I found it easiest to hop on an elliptical trainer at the back of the weight room so that I could oversee what students were doing. It was also gratifying to see how my colleagues responded to seeing the students in the weight room and how our principal "high-fived" the boys, on more than one occasion, while they worked out in the weight room. Everyone became our cheerleader! These students began to feel more a part of the general student population through the activities. They were using the schools' weight room and interacting with their peers and other adults in a meaningful and purposeful way and they began to feel authenticated by those actions. The students' social world expanded and contributed to their sense of confidence. They recognized that they were 'working out' in the same place the football players did and they felt very proud of that. There were also situations when they felt intimidated by the other people in the weight room. An example was their refusal to go into the weight room occasionally because there was a group of grade 9 girls working out and they stated "we can't go in there, we might sweat" and "I don't need exercise today." A gentle persuasion guided them to another form of exercise for the day but it was so interesting to watch their responses and inform my practice according to their perceptions. These simple, yet effective experiences provided students with a sense of belonging within the life of the school. I wondered if we might have motivated other teachers and students to get moving for 15 minutes just because it works so well to minimize anxiety?

Through this experience, I observed positive results with my students. Working towards improving learning outcomes for my students and encouraging a more positive learning environment were two goals of this inquiry. Through the exercises the students' behaviors were notably different and a sense of satisfaction fills a teacher who has been able to assist her students in feeling better and learning better. Pedagogies for improving practice must be imagined and implemented to ascertain if benefits will occur. Curriculum is more than subjects. Mitchel (2016) discussed various definitions of curriculum with over 120 documented from various educational perspectives. Paying closer attention to the needs of our students commands us, as educators, to provide the changes to pedagogy and curricular experiences required to enhance more positive outcomes for students. This includes not only the academic portion of their day but the affective and physical as well. As I challenge myself to maintain high professional standards with my students, regardless of their exceptionalities, I feel gratified to see them struggling less and appearing calmer and more productive. My students are becoming more engaged, more enlightened, less anxious, and well on their way to experiencing a quality education and a greater sense of well-being through exercise. As I am about to embark on another school year with 22 young people diagnosed with

ASD, I will once again be asking my students to exercise with me. I believe that through movement, educators can change lives.

Ethan's Story

Ethan registered in my Autism/Asperger's Resource Room four years ago, as he was just about to enter Grade 9. He was quiet, unassuming, and often shunned communication with others. Ethan's behavior frustrated his teachers and they would come to me with numerous concerns including his lack of communication or his refusal to show his work. He even accused teachers of purposely losing his assignments. He regularly shut shown and blamed others for his lack of understanding. Ethan's parents were dedicated and relentless in pursuing the right programming for their son. However, despite most attempts from both his parents and educators, Ethan seemed to be operating from within a bubble. Then Ethan was exposed to this regulation program. He almost immediately became hooked on something! Was it the routine? Was it the expected behavior that satisfied his need for structure? Could it be the social connections he began to develop with his peers? Or did he like being able to plug in his earphones at the beginning of a workout and listen to his favorite music and tune out the world around him?

All of these factors could have contributed to the early success we had with Ethan while he devoted 15 minutes of each class to a regulation activity. Over the next two years, Ethan slowly began achieving success in his classes and producing more written output than ever before without prompting. He was contributing ideas in class discussions and teachers were reporting how effective he was becoming at communicating his ideas. At our regularly scheduled IIP (Inclusion and Intervention Plan) meetings at which parents, teachers, and students meet to set inclusive goals for the student for the school year, Ethan's parents and I began to share more success stories of his progress in classes, his new connections with peers, and his willingness to try new things. Ethan was even participating in a Career Work Education class and was able to secure employment after his volunteer placements were complete. His complexion began to clear; he was not nervously picking at his skin or obsessively clearing his throat any more. Slowly, Ethan emerged and I am proud to say, he will be graduating after one more semester of upgrading in the coming school year.

I was invited to speak about our regulation program and the exercise innovation at our school division's Trustee Meeting in 2016. Ethan and his parents joined me in talking briefly about their experiences from a parent and student point of view after being involved in this regulation program for four years. Ethan's mom spoke from the heart as she described her little boy, now a young man, who had refused almost everything involving school from a very early age. Many interventions had been tried, some successful, some not, all in an effort to help Ethan achieve his potential. What she was able to communicate beautifully as a parent was that Ethan had not only embraced the regulation exercise programming that was required each day, but that through this effort, he had changed as a human being. Her compelling testimony confirmed for me that this regulation program had made a difference to him. Ethan stated:

I know when I graduated from [Elementary School] I was pretty scared of high school; scared of not making friends and of the assignments...but when I went in to the Resource room it felt really easy for me to make friends and I got a lot of work done in the Resource room. It really lowered my anxiety level and made me feel calm and wanted in that room.

Ethan's mother shared:

One of the things I really liked most when they started with self-regulation at Ethan's school, when Ethan was in Grade 9, was it wasn't just about regulating their bodies and their emotions and their anxiety --they also used it as a learning opportunity for social skills. If there was something going on in the classroom they had fun, experienced a stress-less environment to discuss those kinds of things and to use those kinds of opportunities as teaching moments. There are so many teaching moments through the day and to have people who understand these kids and understand how they learn and use those opportunities to teach them is just invaluable.

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