CHAPTER 1

What Is Self-Regulation?

Key Takeaways from This Chapter

- Self-Reg is a process for enhancing self-regulation by understanding stress and managing energy and tension.
- Self-Reg is an ongoing lifelong process; it is not a program.
- Self-Reg is based on a large body of scientific research.
- Self-regulation is not self-control, but there is a relationship between self-regulation and self-control.
- We all—children and adults alike—self-regulate, but sometimes we do it in ways that are maladaptive.

Self-Reg Is a Process, Not a Program

As we will see in this chapter, Self-Reg, as we define it and as it is reflected in this book, is grounded in the original, psychophysiological definition of *self-regulation*, which refers to how we manage stress—how much energy we expend and how well we recover. This definition, which came out of the work of a number of researchers, as detailed in the pages that follow, has guided Dr. Stuart Shanker in his work on self-regulation, both in his five-domain model and in his five-practice method. As an educator, you have likely seen instances where Self-Reg is treated as a normative skill, akin to being able to monitor and manage (control) one's emotions, thoughts, and behaviour. You will also likely have seen it described as a program or a practice that can be incorporated at specific times in the school day.

Put It into Practice
See the companion website for the Chapter 1 videos.

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Before we look at the historical roots of self-regulation theory, we want to highlight what the practice of Self-Reg is and, just as importantly, what it is not (Figure 1.1).

Put It into Practice
You can find a reproducible version of Figure 1.1 on the companion website.

Figure 1.1 What Self-Reg Is and What Self-Reg Is Not

Self-Reg is...	Self-Reg is not...
a process for understanding stress and managing energy and tension	a program
a process for understanding and responding to the stress system roots of • behaviour • student learning skills, motivation, and accountability problems • student social struggles • strong emotions that impact energy systems	a program focusing on a specific area such as • behaviour management • student accountability, motivation, and/or learning skills • social skills • social-emotional learning
mindfulness—lived Self-Reg is mindful self-regulation	a mindfulness program
inclusive of all students and adults	a segregated classroom for students with challenging behaviours
inseparable from relationships, teaching, the learning environment, and day-to-day school life	a series of lessons

In Self-Reg, we learn the science to deepen our understanding of stress and then develop competencies to manage tension and energy (our own and others'). Some benefits to practising Self-Reg may include the following:

- increased energy over the course of the day and the week
- fewer days missed due to illness
- fewer emotional meltdowns
- reduced frustration
- quicker recovery from disappointment
- improved concentration
- reduced distractibility
- improved pattern recognition
- enhanced interpersonal skills
- improved recognition of what others are thinking and feeling (mind reading)
- increased alignment between one's facial expressions and one's thoughts and feelings (mind displaying)
- fewer social blow-ups

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Contributing Theories to Self-Reg

An extraordinary amount of research from the fields of neuroscience, physiology, psychophysiology, psychology, and clinical practice was synthesized to develop a framework for understanding and improving self-regulation across the five major stress domains: biological, emotion, cognitive, social, and prosocial. This model was first presented in *Calm, Alert, and Learning* (Shanker, 2013) and is further referenced and developed in this handbook. The pages that follow highlight key researchers and their theories that have contributed to the development of our understanding of self-regulation.

Claude Bernard, Walter Bradford Cannon, Hans Selye: Maladaptive and Beneficial Modes of Self-Regulation

The three founders of the psychophysiological view of self-regulation theory—Claude Bernard (1865/1957), Walter Bradford Cannon (1932), and Hans Selye (1956)—laid great emphasis on the difference between what we might describe as maladaptive modes and beneficial modes of self-regulation. For example, a young child might deal with social stress by avoidance or shutting down, which are said to be "maladaptive" modes of self-regulation because they result in even greater stress. Similarly, an adult might self-regulate by resorting to junk food or alcohol, which provides a temporary relief from stress but creates even greater stress down the road. Beneficial self-regulation, on the other hand, involves responding to stress in a way that brings back balance; for example, the healthy practices that children and adults are naturally drawn to in their lives such as exercise, reading, time spent outdoors, hobbies, time with loved ones, or listening to music.

Bernard, Cannon, and Selye laid the foundations for the psychophysiological understanding of stress and self-regulation on which this Self-Reg Framework is built. Self-Reg, a process for mindful (and beneficial) modes of self-regulation, involves inter-related practices for managing and recovering from stress. Self-Reg's focus on maintaining a healthy energy and tension balance applies as much to a student

My Notes

as to any educator or caregiver in that student's life. The practice of Self-Reg occurs within contexts and relationships. What a student in a state of distress or struggling with self-regulation needs is individualized to that student, within the particular context and time, and within the relationships of that student's daily life. Students self-regulate (deal with stress) in all sorts of ways, many of them maladaptive. We are not trying to "get them to self-regulate" (a common misperception); rather, we try to improve the ways in which they self-regulate (deal with stress).

Stephen Porges: The Hierarchy of Stress Responses

Neuroscientist Stephen Porges's Polyvagal Theory describes a hierarchy of autonomic nervous system responses to stress (2001, 2011) significant to understanding Self-Reg (Figure 1.2). Dr. Porges's theory describes the evolutionary development of three stress response states: immobilization, mobilization, and social communication or social engagement (2001, 2011). Porges first proposed the Polyvagal Theory in the 1990s, extending, in particular, the understandings of the role of the vagus nerve in the function of the parasympathetic system. Porges discovered more than one vagal pathway: the older (in evolutionary terms) unmyelinated dorsal vagus nerve is responsible for parasympathetic immobilization, while the newer ventral vagus nerve regulates the heart and is associated with the social engagement system (Porges, 2001, 2011).

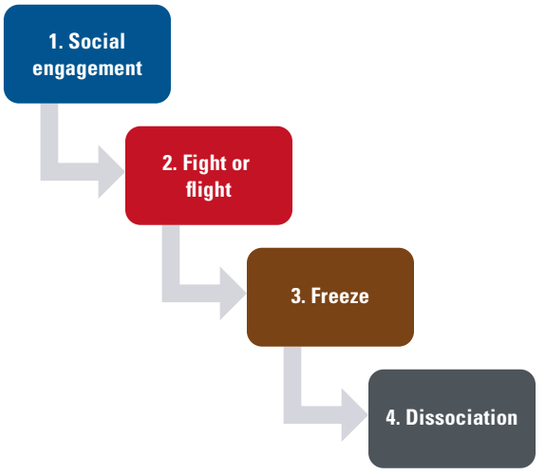
Polyvagal Theory is significant, for example, to the fields of trauma and Autism Spectrum Disorder (ASD) because it deepens the understandings of stress responses that were previously unexplainable. Instead of viewing an individual's stress responses as involving either sympathetic nervous system activation (fight or flight) or parasympathetic nervous system activation (freeze), Porges proposed a hierarchy of stress responses.

According to the hierarchy of stress responses, when social engagement (1) is not available or sufficient, the brain shifts to a sympathetic activation state of fight or flight (2). In this state, social interaction is not only avoided but can also become a stressor in its own right: that

My Notes

is, the child flees from or fights with us, even when we are exactly the resource they most need. If the danger persists, the brain shifts to a parasympathetic immobilization state of freeze (3) to marshal dwindling energy reserves for one last push for survival or into (4) dissociation. This last state of dissociation or tonic immobility is thought to be a way of reducing psychic and physical pain.

Figure 1.2 Hierarchy of Stress Responses



Source: Adapted from Porges's (2001, 2011) theories

Put It into Practice
You can find a reproducible version of Figure 1.2 on the companion website.

Understanding stress and brain-body responses to stress and beginning to read the signs of too much stress are part of the practice of Self-Reg and informed by the Polyvagal Theory and the hierarchy of stress responses.

Paul MacLean: The Triune Brain and Metaphor

Dr. Porges's hierarchy of stress responses is grounded in neuroscientist Paul MacLean's (1990) Triune Model of the brain (Figure 1.3). Dr. MacLean first began to talk about the Triune Brain in the 1960s. His idea was that the human brain is composed of three distinct sub-brains—reptilian, paleo-mammalian, and neocortex—that evolved in different epochs, each serving a different set of needs. According to Dr. MacLean, the reptilian brain evolved to meet the needs of lower organisms that, from birth, are on their own and remain singletons throughout their lifespan. The paleo-mammalian brain, or the "limbic

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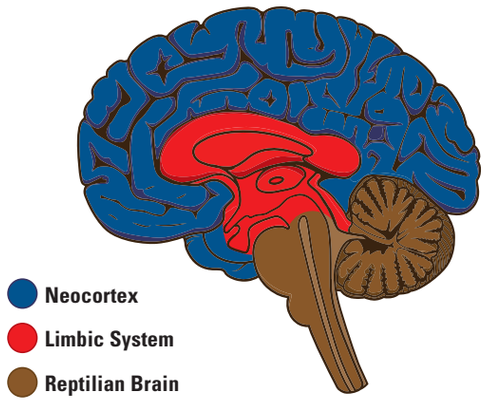
system" as Dr. MacLean also called it, then evolved to meet the social needs of mammals. The neocortex of MacLean's Triune Brain subsequently evolved to serve the increasingly complex cognitive and communicative demands of higher primates. In *Homo sapiens*, Dr. MacLean argued that the neocortex is layered on top of the "earlier" brains, which were retained because of their survival value.

Figure 1.3 The Triune Brain



Source: The MEHRIT Centre, based on MacLean's (1990) Triune Model of the brain

Put It into Practice
You can find a reproducible version of Figure 1.3 on the companion website.

The study of brain evolution, like so much else in neuroscience, has exploded over the past two decades. Few neuroscientists today would think in terms of the human brain as being literally composed of "three separate brains." Rather, the human brain is thought to host complex top-down and bottom-up interactions along the neuroaxis (Shanker, 2019b). The neuroaxis is conceptualized as proceeding from the lowest or most primitive level of the brain (the brain stem) to the most advanced structures in the cerebral cortex. The oldest levels are the most structured at birth, while those at the upper end are the highly plastic structures that are fundamentally shaped by a child's experiences (Lewis, 2005; Lewis & Todd, 2007; Tucker, 2001).

For Self-Reg, the Triune Brain serves as a metaphor that highlights the different processes of neocortical and subcortical functions and how these influence each other. Accordingly, in Self-Reg, we distinguish between being in Blue Brain, in which the systems supporting higher functions (e.g., language, reflective thinking, self-awareness)

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are dominant; Red Brain, in which limbic functions are dominant; and Brown Brain, in which ancient survival mechanisms (e.g., fight, flight, or freeze) are activated.

In Self-Reg, being in a Red Brain state is not defined in strictly negative terms (e.g., the inability to be rational). The Red Brain oversees its own distinct operations and has its own distinctive set of characteristics, many of which are affiliative and motivational. One of its most important functions is to scan the social and physical environments for signs of safety or danger, which Dr. Porges (2001, 2011) referred to as "neuroception." A large part of Self-Reg involves learning how to "speak limbic" and teaching children when and how to avoid going into Red Brain and, equally, when and how to capitalize on being in Red Brain (Shanker, 2017a).

The Blue Brain and Red Brain Distinction

We began using the simple Self-Reg terms *Blue Brain* and *Red Brain* to capture what the research team saw at the Neurolab of York University's Milton and Ethel Harris Research Initiative (MEHRI) from 2005 to 2012 (Casenhiser, Shanker, & Stieben, 2011). When children were in a high-arousal state, the topographical representations of their electroencephalogram (EEG) waveforms were almost entirely red—and most vividly so in the structures closely connected to their limbic systems. There was only a scattering of blue in the prefrontal cortex part of their brains. But when children were calm, the pattern was reversed: now the images were overwhelmingly blue throughout the prefrontal cortex, with just a few isolated spots of red in the areas associated with the limbic system. Corresponding to this visual shift were significant changes in the children's social and emotional functioning. Consequently, *Blue Brain* is used in Self-Reg to signify when the prefrontal systems that support thinking and self-awareness are dominant, and *Red Brain* when the subcortical systems in the limbic system are dominant.

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In Self-Reg, it is imperative that we recognize when a child's limbic alarm (the amygdala) has been triggered and that we respond in a manner that turns it off. This helps the child or youth restore Blue Brain/Red Brain balance, rather than tipping them into a Brown Brain survival response. When the latter occurs, the child or teen regresses to a pre-social "reptilian" state where their "higher" functions—their ability to process what we are saying, let alone "exercise self-control"—are severely compromised.

> "So many of the behaviours we see in children today seem inexplicable until we realize that we are dealing with the effects of excessive stress."

Consider the following scenario in which Jake, a five-year-old child in kindergarten, "goes Red Brain" and gets into trouble at recess.

SELF-REG SCENARIO

Part 1: Trouble at the End of Recess

The end-of-recess bell rang just as Ewan, one of the kindergarten teachers, arrived at the back door to pick up his class. Student lines were forming while on-duty teachers swept the yard for stragglers.

As Ewan's students were lining up, one of them—Jake—punched his classmate Connor in the jaw. Fights occasionally broke out in the playground during recess, but what made this one different was that Jake was fine one moment and aggressive the next, seeming to intentionally hurt Connor. Or, that's how it appeared to the adults watching.

The punch led to a full-on brawl between the two boys. Jake started crying as he kept hitting Connor. Connor fought back, mostly trying to defend himself. It all happened in what felt like an instant. Ewan broke up the fight, made sure that both boys were okay, and then took his students back to their class to begin working through what had happened. The question of *why* puzzled Ewan, even knowing these were five-year-olds. There did not seem to be a why. Jake was not able to articulate why he had hit Connor, but he was clearly still very angry as they went back to the class.

Ewan settled his students in their afternoon centres and then took Connor and Jake aside. Ewan's teaching assistant thought that perhaps Jake should be punished for his misbehaviour. Ewan wasn't so sure. He felt there was something he might miss if

My Notes

he just focused on the surface of what had happened—managing the behaviour (and punishing the misbehaviour). But he also had to admit he did not seem to be getting anywhere talking this through with the two boys. Jake said sorry and Connor accepted the apology. Ewan saw that both students were going through the motions, and he worried that Jake was not accepting accountability for what he had done. Ewan decided he would talk to Jake's and Connor's parents.

Reflect and Connect

- In what ways is this playground incident between Jake and Connor similar to and different from playground problems in your context?
- Why do you think the teaching assistant considered punishing Jake right away for punching Connor?
- How might you have responded to the incident with Jake and Connor?

Robert E. Thayer: The Thayer Energy-Tension Matrix

Psychologist Robert E. Thayer (1996) was interested in the effect of arousal on mood and behaviour. Dr. Thayer's matrix (Figure 1.4) represents four distinct arousal states, each of them a function of energy (glucose consumption) and tension. Thayer explored the relationship between physiological states related to energy, tension, and motivation. The matrix has added another underpinning to the practice of Self-Reg that encompasses the brain-body impacts of multiple stressors. Whereas Polyvagal Theory looks at responses to a stress, the Thayer Energy-Tension Matrix considers the underlying state when encountering that stress.

When raising issues of challenging behaviours in children, parents and educators often ask questions such as the following:

- How do you help a child to restore?
- Why is it so hard to get children to rest when they are overtired?
- How do you help motivate a child?
- Why does a child just "give up" when you know they're capable of mastering a challenge?
- What makes a child stick with something?

The Thayer Energy-Tension Matrix provides a physiological snapshot that might help us answer these common questions.

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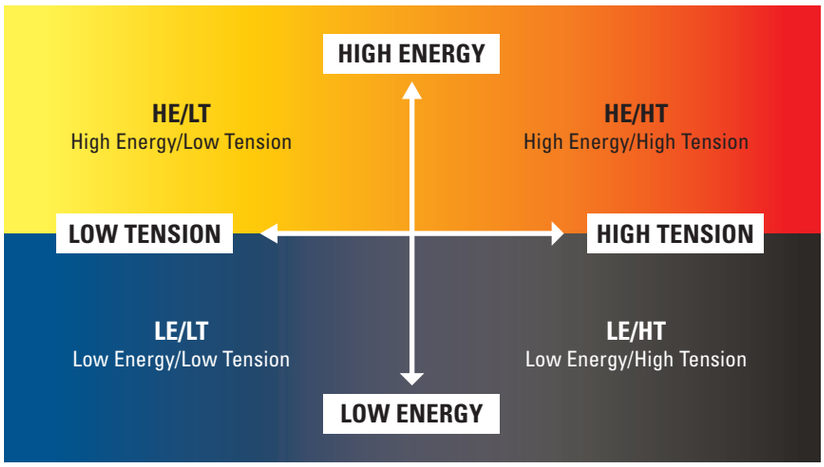
Put It into Practice
See the companion website for a reproducible version of Figure 1.4 as well as a template for mapping your or your students' energy-tension states.

Figure 1.4 The Thayer Energy-Tension Matrix



Source: Adapted by The MEHRIT Centre from Thayer (1996)

The four states in the Thayer Energy-Tension Matrix are as follows:

- **Low Energy/Low Tension:** In LE/LT, heart rate and breathing are slowed while metabolic recovery functions (e.g., digestion, cellular repair and growth, the immune system) are enhanced. In this state, a child is not only calm but is also most receptive to restorative activities (e.g., sleeping, resting, chatting).
- **High Energy/Low Tension:** In HE/LT, a child is optimistic and resilient; they seek out and enjoy social interactions; they do not shy away from the prospect of a physical or cognitive challenge.
- **High Energy/High Tension:** In HE/HT, a child can sustain concentration (which is a whole-body phenomenon). In this "flow" state, the sympathetic (energy-producing) and parasympathetic (energy-restorative) processes are balanced, enabling the child to stay immersed in an activity.
- **Low Energy/High Tension:** In LE/HT, a child is prone to resist anything that promotes rest and restoration. They are often driven to pursue a stimulus-rich activity in order to produce dopamine and adrenaline and thereby counter their fatigue (further depleting their energy reserves).

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We can use the four energy and tension states from the Thayer Energy-Tension Matrix as part of the practice of Self-Reg. We learn to enhance our awareness of which energy-tension states the students we work with are in and begin to recognize patterns in how our own states affect our mood and behaviour. Over time, using the Thayer Energy-Tension Matrix as part of Self-Reg, we develop the skills needed to recognize and respond to our own energy-tension states and sometimes to help others learn to do the same.

The Relationship Between Self-Regulation and Self-Control

There is a perception on the part of some people that many children and youth today lack self-control and this leads to escalating problems with behaviour in the classroom. Learning to speak limbic—in other words, learning more about stress and the Red Brain—provides a different way of thinking about and responding to behaviour, allowing us to go to the root of the problem. The first step of the journey is understanding the difference between self-regulation and self-control.

It is essential that we do not confuse self-regulation with self-control. Self-control is about trying to inhibit impulses; self-regulation is about reducing the incidence and intensity of impulses in the first place. Self-regulation is what makes self-control possible, and in many cases, unnecessary.

Consider again the scenario of Ewan and his kindergarten student Jake.

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SELF-REG SCENARIO

Part 2: Ewan Wonders Whether Jake's Problem Is a Lack of Self-Control

Ewan knew a little about the brain and stress from attending workshops over the years. He recognized fight-or-flight responses and had learned about the freeze response, but he was not convinced that these were really relevant to his work as an educator. Ewan believed that the fight-or-flight responses he saw in his students (such as what he had witnessed between Jake and Connor) were choices they were making. The students could equally have made better choices to do the "right thing."

Ewan recognized that the students in his class were young and they wanted to do well and to get along with others. He was convinced that the problem was that they did not know how to self-regulate.

Ewan thought that "self-regulating" meant self-managing and making good choices, and so it came down to intention and will-power. He wanted all of his students to have the strategies in their toolbox to self-manage—to not just endure challenges, but to blast through them. He also wanted them to respect rules and one another. No matter what skills or strategies he taught his students, however, the behaviour issues continued. Ewan was convinced that his students' refusal to take responsibility for their own behaviour and learning was at the core of the problem.

Reflect and Connect

- Like Ewan, many teachers have learned about stress and the brain. How would you describe your current understanding of the brain, stress, and student behaviour?
- Do you agree with Ewan that fight-or-flight responses are choices? Why or why not?
- In your context, are different definitions of *self-regulation* being used? What are some examples of challenges that result?

In the above scenario, Ewan was, in fact, confusing self-regulation with self-control. Self-regulation refers to how well we manage stress. The veritable epidemic that we are seeing in the number of students with heightened impulsivity and poor frustration tolerance points to the fact that students' stress levels are excessively high and/or they are relying on maladaptive modes of self-regulation. As a result, their recovery from activities requiring effort—physical as well as mental—is compromised.

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We are not just talking about toxic stress in the early years, which is a potent factor in setting a child's "stress reactivity" and fostering maladaptive modes of self-regulation. What is deeply worrying are the myriad of hidden as well as overt stresses that students of all ages are struggling with and the ubiquity of dopamine-hijacking devices. Excessive stress coupled with poor recovery impairs students' ability to pay attention, solve problems, get along with classmates, grow emotionally, and develop empathy and internal standards.

Why is there so much confusion about what self-regulation is and how we nurture its development in young people?

One reason for the confusion is that many educators are working from a different understanding of self-regulation than the psychophysiological definition. They are, in fact, confounding self-regulation with self-control (Burman, Green, & Shanker, 2015; Hopkins, Shanker, & Leslie, 2017).

With a self-control focus, we expect children to

- inhibit impulses
- suppress emotions
- manage their own behaviours

These expectations mean we assume children are in Blue Brain states.

With a Self-Reg focus, we

- recognize that Blue Brain and Red Brain states affect the ability to demonstrate self-control
- reflect continually on two questions: "Why this child?" and "Why now?"
- consider the "how now" next steps: recognize and reduce the negative stressors at the root of learning, mood, and behaviour problems

Recognizing the difference between a self-regulation focus and a self-control focus has implications for how we respond to children's behaviour, how we engage students, and how we build relationships—in addition to our own well-being.

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It is natural and, in some circumstances, desirable for a child to go into a Red Brain state; for example, if a child is playing sports. We only become concerned when the child goes into this state far too frequently and too readily or has a great deal of trouble coming out of it and returning to Blue Brain/Red Brain balance. We cannot hope to reason with or teach a child in Red Brain how to think or act in a different manner. Punishing a child in such a state for a perceived lack of self-control is the one response guaranteed to impede that child's emotional, cognitive, social, and prosocial development.

> "There is no such thing as a bad child."

For a child who is chronically slipping into a Red Brain state, it is imperative that we learn to read not just the signs of when this has happened but also the signs that it is impending and, of course, the stressors that are triggering this shift. The ultimate Self-Reg goal is to help children acquire the necessary understanding of when and how to manage their own energy and tension, so they can adapt to the ever-changing and increasing stresses that define growing up. Learning how to self-regulate in a growth-promoting manner is a lifelong process, characterized by endless setbacks and moments of stunning clarity. The better we can set a child on this path, the more that child will thrive.

In Chapter 2, we will take a detailed look at the five-domain model of Self-Reg first explored in *Calm, Alert, and Learning* (Shanker, 2013), examine closely the five-practice method of Self-Reg, and begin a Self-Reg journey together.

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